Think

BUMPER CROP

The rookies of this year's Hundred Percent Clubs

STORM WARNING
The perils of protectionism

Letter from the Chairman

How to win friends

One of the surest signs of the health of the business is the rate at which we are hiring new people this year. Not only are we recruiting more from the campus than in any year since the 1960's, but we are also bringing others into the company in our offices, plants and labs.

Not surprisingly, we get many more good applicants than we can accept. In turning them down, we can either sour them on IBM or keep them as good friends—it all depends on how we do it.

So I would urge you to treat everyone with the same consideration, the same understanding given those we hire. Any applicant who extends us the courtesy of offering his or her services to IBM is entitled to equal courtesy in return. Respect for the individual is not something we reserve for employees only. It is the due of everyone who comes through our doors.

Clean bill of health

You may have read about the Federal Trade Commission's dropping its investigation of whether IBM had monopolized the office typewriter industry. Their decision that no further action was called for came after two years of looking carefully into every aspect of our Office Products business.

That's good news. It not only underscores that word processing is a young industry with many new entrants and a dynamic technology. But it says to others what we have always known about ourselves—that we do compete fairly, that we do behave properly, that our business conduct is beyond reproach.

It's encouraging that, when the facts are allowed to speak for themselves, we can expect a positive result. That's something I believe will hold equally true in the Justice Department suit.

All paid up

Perhaps many of you, as I do, often hear that large corporations get off lightly in their payment of income taxes. That they get special tax breaks not available to smaller firms.

Well, after two years of closely examining more than 200,000 tax returns, the Treasury Department has found that quite the opposite is true. The larger the corporation, the higher its effective tax rate is likely to be.

On last year's earnings of $5,092 million, IBM laid aside $2,373 million for the payment of U.S. and non-U.S. corporate income taxes. That comes to an effective rate of 46.6 percent of pre-tax earnings. In one recent year, in fact, we headed the list as the biggest corporate income taxpayer in the United States.

Why that trip to China?

Since returning from my trip to China, I've been asked by some people why I went.

As you know, for some years now our Government has felt it in the national interest to open the doors in our relations with China, including the possibilities of trade.

Whatever some might think of that policy—and we all have the privilege of disagreement—I strongly believe it important that a company like IBM keep in touch with the tremendous changes taking place everywhere in the world, and especially in the Far East. China is a nation of 852 million people and certain to play a role of increasing importance in world affairs. Inevitably, the question of trade will come into the picture, and I would think us remiss if we did not begin to form some impression of what the future may hold for U. S. business there. As a result of this trip, I feel better prepared to deal with whatever coming events may bring.

On merit alone

In Kansas City recently, IBM's president John Opel was given an award by the Missouri Conference of Christians and Jews.

The award is one more confirmation of how highly IBM people are regarded by those organizations whose purpose is to promote amity and understanding among people of all races and creeds.

IBM has always worked at this and in a way that counts most—by offering equal opportunity to all employees. However well or poorly one might do is measured solely on performance. There's no better yardstick, and we will continue to act on that belief.

Frank Cary

Front cover, left to right: Ray Huger, General Systems Division; Sean Ryan (kneeling), Data Processing Division; Joe Gieger, Office Products Division; Richard Turmel, Science Research Associates, Inc.; Cathy Bartlett, Information Records Division. Back cover: Curt Wann, Federal Systems Division.

in think

Up front What's doing in the industry, the business, and with people here and there.

Letters

Catch up To keep you up to date on happenings you may have missed.

STORM WARNING

Not since the disastrous trade wars of the depression-ridden 1930s have protectionists been coming out of the woods in such numbers as today. An unhappy omen for all international companies, including IBM.

by Geoffrey D. Austrian

In German, the word is *Seiltänzer*. In Italian, it's *funambolo.* Whatever the language, "tightrope-walker" aptly describes the precarious balancing act of the world's major trading powers as they teeter toward free and open trade, then tilt back dangerously toward growing protectionism.

For most of the postwar era, there has been progress toward an open trading system—with increased access to markets wherever they may be. In a historic though little noted step, the nine-member European Economic Community last July swept away the last internal duties between member nations and with six European Free Trade Association countries.

It's been a healthy trend, reflected, until recent years, in a growing volume of world trade and a higher standard of living for most of the world's people. And the "one world" philosophy that emerged from World War II has been crucial to a company like IBM, which

banks heavily on the worldwide marketplace and worldwide development and earns a good part of its revenues from outside the U.S. (In 1977, for the third year in a row, IBM derived slightly more than half its revenues from outside the U.S.)

But today, a strong ebb tide of protectionism—including measures in the U.S. Congress that could severely damage the ability of U.S. corporations to compete abroad—threatens to erode these hard-won gains. Ironically, these threats appear just as the world's major trading nations are getting down to hard bargaining at Geneva to negotiate a liberal trade policy for the years ahead.

Fueling the new protectionism are a number of factors. Among them:
• Rapidly rising imports, resulting in last year's record $26.7-billion U.S. trade deficit, have stimulated protectionist outcries at home—principally from industries and workers hurt by the

influx of steel, shoes, TV sets, textiles and other foreign goods. The imbalance, aggravated by rising payments for imported oil, has eroded confidence abroad in the value of the dollar against other major currencies, upsetting the equilibrium of the world monetary system.
• In Western Europe, slow growth and high unemployment continue to plague most countries. In such an environment, few governments are willing to reduce trade barriers and watch their industries get hurt.
• Japan, whose export bonanza has resulted in a $17-billion trade surplus, seems to have become everybody's whipping boy. This, despite the fact that its export-geared economy is wholly dependent on foreign oil and most other raw materials paid for out of trade surpluses. With its domestic economy operating far below capacity and unemployment rising, Japan has been reluctant to open its markets to manu-

factured goods from other countries.

Nearly everyone, it appears, is for progress toward free trade—so long as their industries are flourishing, employment healthy, inflation under control, payment and trade balances favorable and everything else generally going their way. This may explain why, in today's highly unsettled and interdependent world economy, a system of free trade remains more a desired goal than a practical reality. The best that can be realized under present conditions, many agree, is a system of fairness in trade among nations rather than entirely free trade—if such a system, indeed, ever existed.

What is the prognosis?

President Carter, in his economic report to Congress, called the protection of a free and open trading system the keystone of the country's international economic policy. However, he also warned that international competition must be fair. Said Carter: "We have already taken and we will, when necessary, continue to take steps to ensure that our businesses and our workers do not suffer from unfair trade practices."

While pushing for progress at Geneva, the Administration has been responsive to calls for help from specific industries. It has, for example, set "reference" prices to protect the steel industry from imports by ensuring that foreign producers charge prices high enough to cover their production and shipping costs and still make a profit. "Orderly marketing agreements" have been negotiated to cut back on imports of shoes and color TV sets. The Administration is also bent on getting Congress to pass an energy program in the face of widespread public apathy—a step that could ultimately begin to cut into the huge U.S. trade and payments deficits.

Meanwhile, pressures have been building in Congress for protection on many fronts. Especially sensitive to complaints from constituents in an election year, Congressmen, as *Business Week* reported recently, "are besieging the office of Robert S. Strauss, the President's special trade negotiator, with telephone calls seeking help for one industry after another."

Within the Congress, there have been caucuses formed for steel, textiles, the shoe industry, the TV industry—the number seems to grow weekly. Even legislators with traditionally liberal views toward trade legislation have been calling for measures to protect special interests in their states.

While growing attention is being

given to raising barriers against imported goods, little emphasis is being placed on making U.S. companies more competitive in world markets. In this regard, the activity of U.S. companies abroad helps stimulate the market for exports. And the earnings that U.S. companies send back to the U.S. have been a stabilizing element in the U.S. balance of payments. Yet, the Administration, in its recent tax proposals, seems to be intent on reversing these trends.

By far the most worrisome measure affecting IBM is a proposal that would change the way the U.S. taxes the income that affiliates of U.S. companies earn abroad. At present, U.S. companies pay foreign taxes on income as it is earned abroad. But they pay U.S. taxes on that income *only* when it is brought back to the U.S.

The proposed changes would impose an additional tax burden on income that U.S. companies earn abroad. Even if a company could not bring this income home, it would still have to pay U.S. taxes on it, and these taxes would have to be paid out of domestic earnings.

In an editorial titled "Crippling the MNCs," *The Wall Street Journal* commented: ". . . the costs of operating a foreign subsidiary will go up, making it increasingly difficult for American companies to compete with other multinationals in foreign markets. This is but the latest in a series of government steps that seem purposely designed to put U.S. companies at a disadvantage against overseas competitors."

No other industrial countries tax foreign source income as it is earned. And some, such as the Netherlands and France, don't tax it at all. "The proposal known as repeal of deferral," says Robert N. Mattson, corporate director of taxes—U.S., "would be the most punitive treatment of a domestic company's foreign income in the world."

Public hearings on the President's

tax proposals began before the House Ways and Means Committee on March 6 and are expected to reach the floor of the House by summer. In the Senate, where the measure would then be referred, a key vote on a proposal for the repeal of deferral was defeated by only a single vote (45-44) when it came up on amendment on June 29, 1976. No one knows how it would come out this time.

"What this could mean," says IBM Treasurer Bertram H. Witham, "is that while most taxpayers would receive tax cuts under the President's tax proposals, the multinational firms would bear a larger burden of the government's expenditures. Since these taxes are a cost of doing business, the increased costs would be passed on directly or indirectly to everyone—stockholders, customers and employees."

Unlike the early 1970's, when the legislation that enabled the U.S. to take part in the current trade negotiations was being forged, the Congressional hopper contains no sweeping protectionist measure, such as the Burke-Hartke bill. Instead, a scattering of protectionist legislation will be introduced, posing the threat that one or more measures could slip through.

AFL-CIO President George Meany has said that organized labor now believes the chances of obtaining all its trade demands "in one fell swoop, is not in the cards." However, the AFL-CIO council has urged that Congress take 15 separate actions, including repeal of deferral and tax credits, to alleviate the "crisis" now being experienced by American workers because of "unfair competition by foreign producers and American multinational corporations operating overseas."

What's different from the legislative climate of the early 1970's is that only industries and workers whose jobs are being threatened or lost seem to be getting public attention. And that, in

It couldn't happen here. Or could it?

Here's a worst-case example of what could happen if protectionism were to get out of control. One nation jacks up its barriers to keep out the goods of others. They retaliate. Stagnation sets in, first in trade, then at home.

Unlikely? Probably. But it happened before, when the trade wars of the 1930s helped bring on a worldwide economic collapse. How to avoid it? By keeping the system open—with free and fair competition for all.

many of these industries, labor and industry are increasingly speaking with one voice. Relatively little is heard from hundreds of firms, many of them small manufacturers, whose livelihood and employment depend on export.

Seldom is it pointed out that one out of eight jobs in U.S. manufacturing firms, according to Treasury Department estimates, is supported by exports. That companies such as IBM contribute substantially to the U.S. balance of trade and payments. (From 1973 through 1977, IBM alone made a net contribution of $5.6 billion to the U.S. balance of payments.) Or that, if protectionism prevails in the U.S., foreign nations will retaliate against U.S. exports and firms doing business abroad.

But the picture is not entirely bleak. Some observers say that by taking actions to help the industries hardest hit by imports, the Administration is buying time for real progress to take place at Geneva. Already, Japan, in bilateral trade talks with the U.S., has signaled an intention to open its protected markets, however slightly, to more imports. Effective March 3, tariffs were lowered on a range of products, including computer central processing units and peripheral equipment. Although still more than twice the level of comparable U.S. tariffs, the cuts could mark a change in direction.

"Their full intent is to compete in data processing on a worldwide basis," says Howard G. Figueroa, vice president—Far East, IBM World Trade Americas/Far East Corporation. "I think that's why, in a measured way, Japan will respond to pressures for freer trade. But they are likely to do it more on their timetable than on ours.

"They're evaluating their ability to protect their home market against their ability to compete in the world market and against the growing protectionist sentiment in the U.S."

1. On the heels of depression and the devastation of war, the late 1940's see the start of recovery and the dawn of a new golden age of world trade.

2. Over the next 25 years, world trade volume grows fivefold as nations everywhere industrialize and trade barriers are lowered. International corporations spread this prosperity by investing in new markets everywhere.
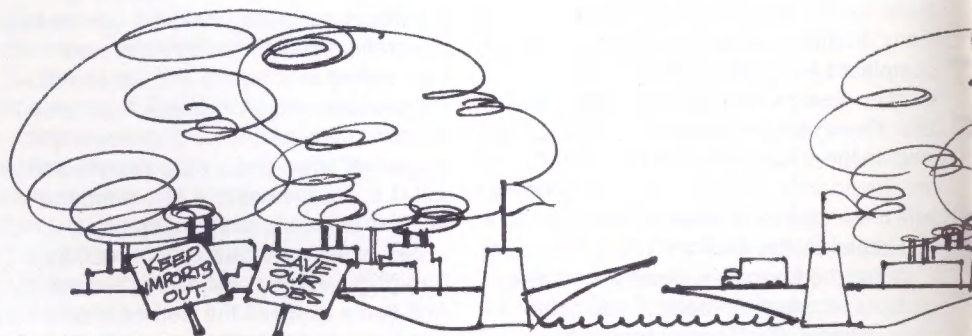
3. In the mid-1970's, on-again, off-again economic problems are capped by the steep increase in oil prices. Growth slows; inflation and unemployment rise. Some nations start to raise trade barriers to protect industries and jobs.
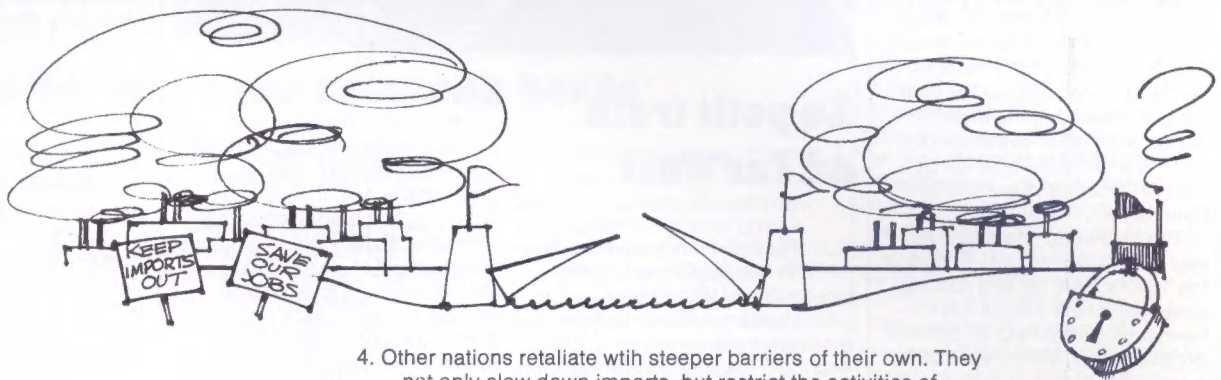
4. Other nations retaliate wtih steeper barriers of their own. They not only slow down imports, but restrict the activities of international corporations.
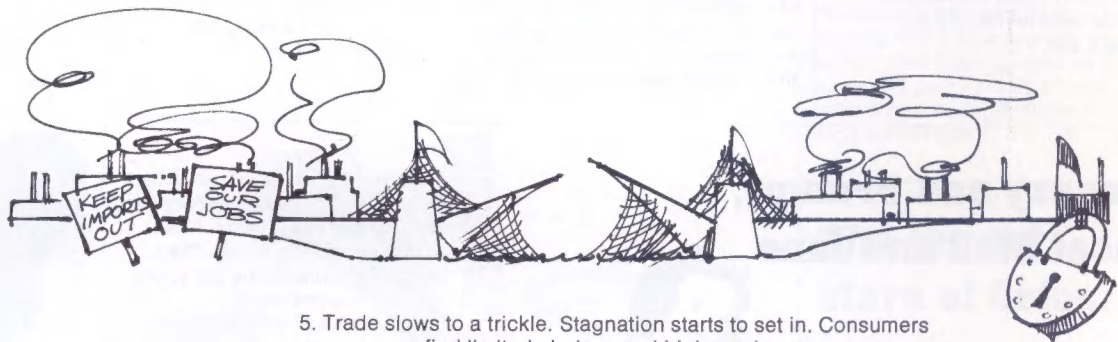
5. Trade slows to a trickle. Stagnation starts to set in. Consumers find limited choices and higher prices.
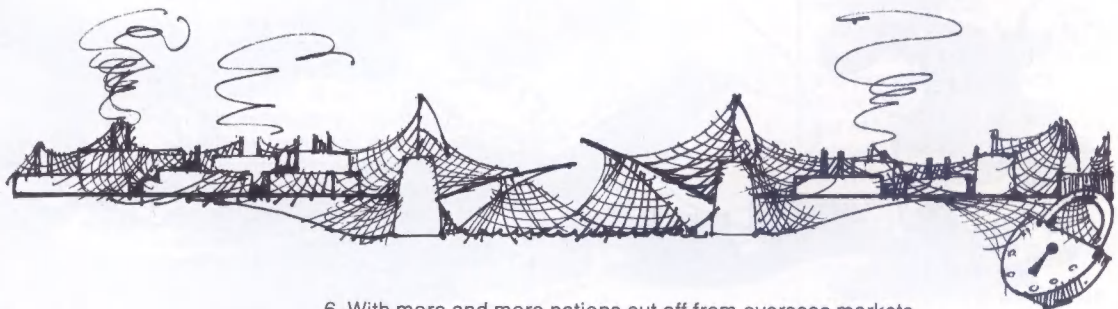
6. With more and more nations cut off from overseas markets. domestic stagnation spreads. The result: world depression.

Hospitals by mail order

Packaged hospitals. That's one answer to the dearth of medical facilities in Latin America, especially in some of its remote areas as well as in some overpopulated urban parts of countries. The 15-ton units, valued at $150,000 each, are fully equipped. That means surgical instruments, X-ray machines, pharmacology and sterilization facilities; even labs and operating rooms. Aided by a contribution from the IBM World Trade Americas/Far East Corporation, 20 of the units will be shipped to countries of Central and South America by the Pan American Development Foundation.

The packaged hospital idea was developed in the U.S. during the 1950's for local and national disasters, and the units have been maintained by civil defense organizations. More than 2,500 were put together, but many were never used and are now considered surplus—a surplus that can mean a new lease on life itself for many Latin Americans.
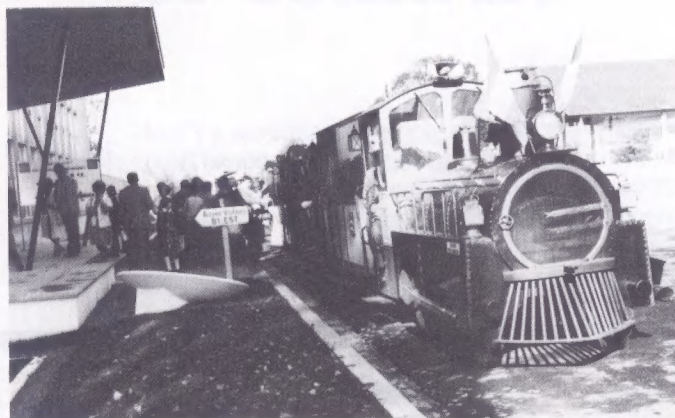
Le petit train du Far West

About half an hour's drive south of Paris lies the Corbeil-Essonnes facility of IBM France, which turns out things such as monolithic memories, modules and logic devices. (It is a sister plant to its American counterpart in East Fishkill, N.Y.) Not long ago, it was a day for other kinds of memories at Corbeil-Essonnes: open house to over 12,000 employees and their kids, retirees and friends. Everybody got an itinerary upon arrival, a guide called *Piéton Futé*, or *Clever Pedestrian.* But for those who didn't feel like walking, there was *le petit train du Far West*—a train model, complete with cowcatcher, that might have chugged out of an old John Wayne movie. It took visitors around the grounds to look at displays and models of plant operations, or to stop and play games with a computer (such as *Maximot)* simulating "The Longest Word," a game show on French television. The games were fun, but it was *le petit train* that stole the show.

Noah had it easier

No matter how extensive a wild game park might be, it cannot support unlimited numbers of any species. That's why, since 1966, the need to watch population ceilings has concerned the staff of Kruger National Park in South Africa.

Up to now, the increasing numbers of large mammals—especially destructive ones like elephants, buffalo and hippos—have frustrated attempts at reliably calculating the ideal population mix. But help may have arrived. A recently ordered IBM System/32 promises to help overcome the problem.

Extensive game count surveys are being conducted by helicopter and ground crews to gather information for the System/32 to analyze. This information will be matched with factors like weather patterns, food and water resources. Out of that may come improved game and habitat conservation practices.

Sneezy and Grumpy, meet Dick and Jane
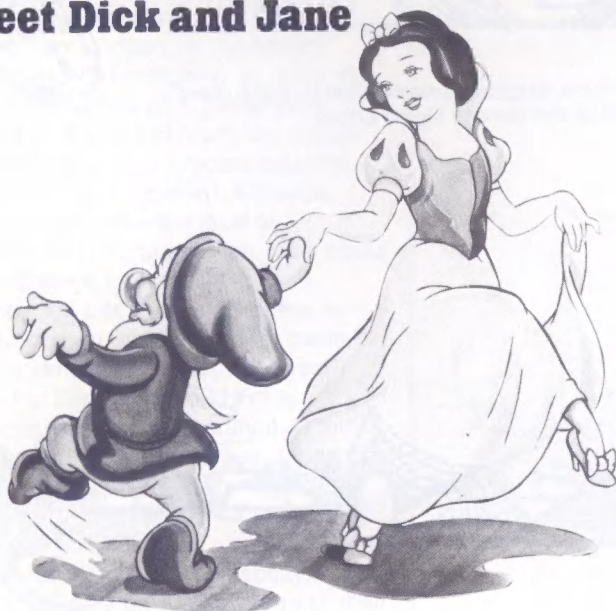
Dick and Jane have skipped through the pages of primary reading books for years. Now, at one publishing house, they are being replaced by the young readers themselves.

Me-Books Publishing Company of New York City uses an IBM System/370 Model 158 to prepare books individually, so that each child and his or her parents, friends and pets —by name—can be the heroes or heroines in the stories. Me-Books has a list of 28 titles, including variations of such classics as *Snow White.* In many of the books, the child's name, address and home town show up as many as 70 times in the narrative. Sometimes, the home address is printed on street signs in the illustrations. If names of friends or pets are not furnished, the computing system automatically alters the narrative to omit such references.

Good news from the back front

More than eight million Americans have "bad backs," and a half million wear braces. The University of Illinois' Circle Campus in Chicago is trying to do something about it. Engineers there are now looking for the causes and cures of back ailments with the help of a mathematical model of the spine developed on an IBM System/370 Model 158.

Drs. Albert B. Schultz, professor of mechanical engineering, and Ted B. Belytschko, professor of structural engineering, are working with orthopedic surgeons to apply the principles of engineering to the skeletal system.

In one experiment, the computer simulates the force applied to the spine by a therapeutic brace to show how effective different types of treatment are. In treating lateral curvature of the spine (scoliosis), the model shows that applying pressure from the side works best.

The study, which is sponsored in part by the U.S. Air Force medical research laboratory in Dayton, Ohio, has predicted the effect of a hip-to-neck brace on a number of patients with 80 percent accuracy.

How sweet it is when you save with bonds

How sweet the future when there's money in the cookie jar. And what easier way to put it there than to turn your dollars into U.S. Savings Bonds. If it's strokes you need, just imagine yourself thanked by the Founding Fathers. But, first and foremost, you'll be doing yourself a good turn.

A dollar saved—or a dollar and a quarter a week, to be exact—is $1,541.28 earned in 15 years (assuming the current 6 percent interest). And $18.75 weekly rises to a respectable $23,300.32. But if you can't wait for your money, you can cash in anytime after the first two months.

Consider this about saving with bonds: It's painless. You never see the money. Payroll does all the arithmetic.

It's failsafe. Uncle Sam guarantees against fire and theft.

Its interest is beyond the reach of state and local income tax. Even Federal income tax can be deferred. And, should you put your bonds in your child's name, chances are neither of you will pay any tax at all.

It could be a college education. If you start saving when your baby is born, bonds and child will grow together.

So, come the first of May, or one of the 11 days thereafter, when one of IBM's 18,000 Savings Bond canvassers approaches you with a payroll authorization card, remember your cookie jar and sign up.

Time out for greatness

During Paul Arizin's 10 years in pro basketball, an NBA all-star game without him was a little like an order of pancakes without syrup. It just didn't happen. Now, in recognition of that sustained record of excellence as a scorer and all-around player, Arizin has been elected to the Naismith Basketball Hall of Fame in Springfield, Mass.

It's an honor the IBM marketing representative coveted. "It's a culmination of all the efforts I put into basketball," he says. These days, Arizin concentrates on his sales career (eight Hundred Percent Clubs) as determinedly as he lined up the basket for one of his patented jump shots. His customer is Du Pont in Wilmington, Del.

During 10 years with the Philadelphia Warriors of the National Basketball Association, Arizin scored 16,266 points—that's an average of 22.8 per game for 713 games. As an All-American at Villanova, he led the nation's college players in scoring with a 25.3 average as a senior. One blazing night, as a junior, he poured in 85 points. All this after failing to make his high school team.

The far out stars of Orion

How are stars born? Conventional theory has it that they can come to be only from the dense center of an interstellar cloud where matter is tightly packed.

But a new study of the nearby constellation Orion may prove otherwise.

Scientists have compared old and recent photographs of the stars in this constellation. Since Orion's stars are young, the scientists hypothesized they would be moving in the same direction as the interstellar cloud from which they were formed.

Using a System/360 Model 65, they analyzed the motion of 140 stars.

Their surprising conclusion: The stars are moving inward, meaning they were formed in the outer areas of the clouds and not at the center.

by Richard Bode
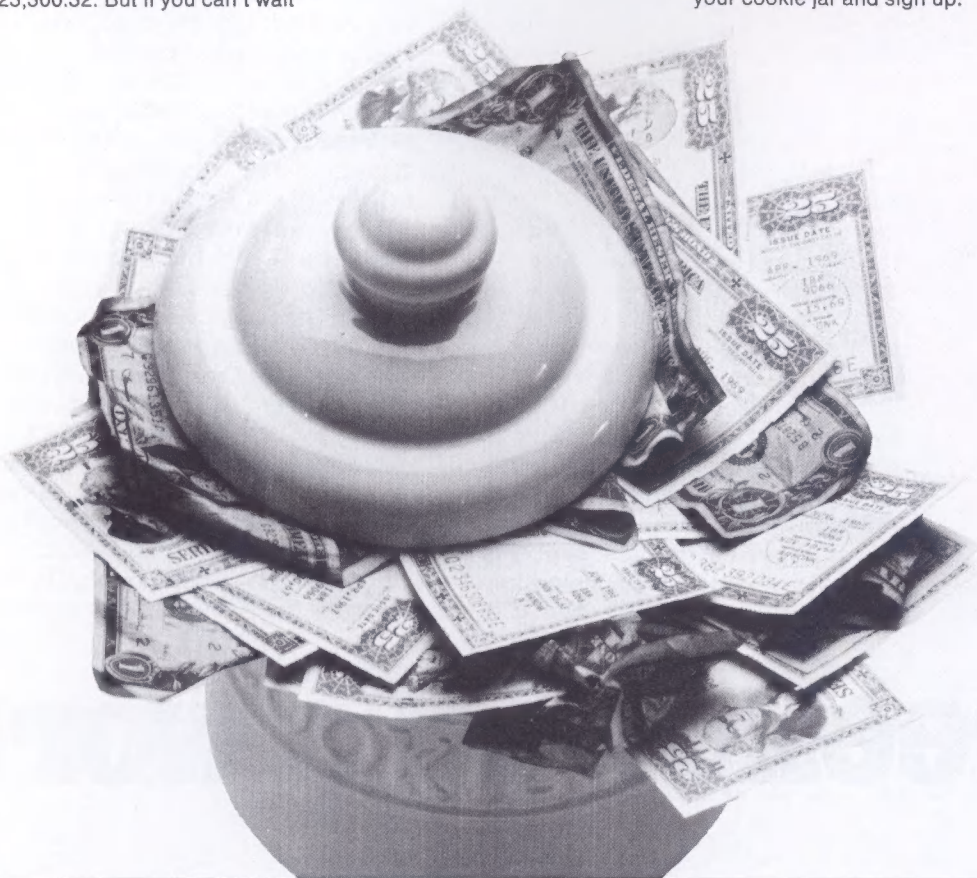
When Lloyds Bank ordered some 600 IBM cash-issuing terminals five years ago, executives of the prestigious British bank had a serious qualm.

What if an electronic eavesdropper wiretapped a line tuned in to the digital signals being sent between the central computer and the cash-dispensing machines scattered throughout England? Wouldn't that imperil the confidential nature of those cash transactions?

Not likely. For to thwart any such meddling, IBM has taken a page from the ancient art of cryptography—a form of writing in secret codes known to almost anyone who has read Edgar Allan Poe.

As part of the Lloyds bank system, the company installed special encryption techniques that scramble and unscramble digital signals as they travel along communications lines. Without the code, eavesdroppers can't tamper with the data on the communications lines.

"The goal in cryptography," says Dr. Lewis Branscomb, IBM vice president and chief scientist, "is to render information undecipherable. We don't need a perfect encryption scheme. What we do need is an encryption so difficult to decipher that the very small chance of success isn't worth the effort."

IBM scientists and engineers have also developed data security techniques for the 3614 Consumer Transaction Facility of the IBM 3600 Finance Communications System, and most recently for the 3624, the automatic teller machine announced on March 14. These facilities let bank customers debit and credit their accounts electronically without checks or cash. And keep a potential intruder from finding out customer information by tapping the line.

The role of cryptography in data processing has progressed well beyond the banking industry. Late last year, for example, IBM introduced three data-security products, all based on a new Data Encryption Standard developed by the company and adopted by the National Bureau of Standards.

Two of the products, the IBM 3845 and 3846, provide communication line security; they encrypt and decrypt information sent throughout a variety of general-purpose computers and terminals. A third product, the IBM Cryptographic Subsystem, can be used only with System/370 computers and data networks. The new products not only scramble data beyond recognition while it's being sent, they also encrypt information stored on disks and tapes.

"Systems security means many things," says John Rankine, IBM director of standards and data security. "It means controlling access to the computer center, to the computer, to the terminals, and to the files. It means devising audit trails so we can trace what information was given to whom and when. It also means protecting data stored on disks and tapes that might be stolen while being moved.

"Data security was much simpler when we just had the computer center to worry about, and the customer had to concern himself with protecting whatever data he transported by physical means. Today, security means much more. But now we can protect data that the customer sends by telecommunications, so that whoever might capture it gets meaningless data."

According to current projections, sometime in the 1980's, data traffic may exceed voice traffic over common carrier lines, such as telephone lines and coaxial cables. As Rankine says, "The trend is toward large data networks which will often carry confidential information. The best way to protect it is to encrypt the message so it can't be understood."

It was back in 1975 that the National Bureau of Standards asked the data processing industry to develop a Data Encryption Standard (DES). Of the procedures submitted, IBM's approach was selected, and IBM made it available on a royalty-free basis.

Today, all Federal agencies that want to encrypt non-classified data are required to use the DES, and companies in the private sector are also tending to use it.

The two men most responsible for the concept and development of the DES are Dr. Horst Feistel, of the Thomas J. Watson Research Center in Yorktown Heights, N.Y., and Dr. Walter Tuchman, manager of data security products at IBM's System Communications Division in Kingston, N.Y. Feistel devised an encryption scheme, while Dr. Tuchman and his engineering team selected the specific approach and implemented it in software and hardware. Dr. Feistel's work was recently described by Dr. Alan G. Konheim, a colleague in the mathe-

The Greeks had a word

for it

Cryptography. How an ancient art has been updated to guard the confidentiality of computer data.

Even Pepys used it to keep his diary private

Cryptography, derived from the Greek words meaning hidden and writing, has influenced the fortunes of kings, generals, smugglers, authors and businessmen.

One of the earliest examples appears in the hieroglyphics sketched on the 4,000-year-old tomb of Khnumhotep II. A master scribe substituted unusual symbols for ordinary ones, apparently to give the inscription weight and dignity.

Spartan generals, according to Plutarch, exchanged secret messages by winding a narrow parchment around a spiral staff, called a scytale. After writing their message, they unraveled the parchment, which could then only be read by someone who had a scytale of exactly the same size.

The historian Suetonius reveals that Julius Caesar also resorted to cryptography—although his method of letter substitution was so simple it could easily be deciphered by a novice.

Charlemagne, the great Frankish emperor, was more subtle. He devised special alphabets and kept his generals up all night memorizing them.

When the Spanish empire was at its height, its far-flung agents communicated by means of a cipher with more than 500 signs. When the French mathematician, François Viète, broke the code, Philip II of Spain petitioned the Holy See to try Viète as a wizard who practiced necromancy.

The Pope, who had cryptographers of his own, wisely refused.

From the 16th to the 18th century, anyone who was important in England had a private encryption. One such cipher saved the life of Sir John Trevanion. When imprisoned by Oliver Cromwell, he received a letter of sympathy on his impending execution that, when deciphered, read: PANEL AT EAST END OF CHAPEL SLIDES.

Samuel Pepys, Secretary of the Admiralty during the Restoration, wrote his candid diary in a code that wasn't deciphered until 1825. And crypto-graphic schemes have found their way into the tales of Edgar Allan Poe, Arthur Conan Doyle, O. Henry and Jules Verne, to name a few.

To outwit police, Prohibition rum-runners communicated with bootleggers onshore by means of encrypted wireless messages.

But, without a doubt, the most intriguing cryptographic stories emerge from warfare—especially World War II.

In the Pacific, a group of American cryptanalysts working at Pearl Harbor broke the Japanese code. As a result, they anticipated, among other things, the attack at Midway.

Meanwhile, in Europe, the Nazis had built their Enigma Cipher Machine, a replica of which was obtained by the British. Working in a country estate outside London, British and American teams built Colossus (which some authorities say was the first programmable computer) to decipher Nazi messages. Their success contributed to the defeat of General Erwin Rommel, the Desert Fox and Commander of the Afrika Corps, at El Alamein.

"Before Alamein we never had a victory," Sir Winston Churchill commented. "After Alamein we never had a defeat."

Samuel Pepys

matical sciences department at Yorktown Heights, and coordinator of IBM's research efforts in that field.

A Zurich-educated mathematician, Feistel joined IBM in 1968, after working in cryptography at the Cambridge Air Force Research Center and MIT's Lincoln Laboratories, both outside Boston. "Even a decade ago we recognized that cryptography would play an important part in data protection," says Konheim. "Feistel's early work for IBM found its way into the banking terminals and culminated in the creation of the DES.

"We've invited some outstanding analysts from Stony Brook, Rutgers and other universities to come to Yorktown and try to break Feistel's code. A few thought they could, but so far nobody has."

There are two basic encryption schemes: stream ciphers and block ciphers. Most military codes are stream ciphers that depend upon a complex method of symbol substitution. Feistel's method is called a key block cipher. It divides the text into eight character blocks, then uses two complex series of both substitutions and rearrangements to disguise the data.

In Kingston, Dr. Tuchman headed the engineering team that translated Feistel's block cipher ideas into a particular derivative that became the DES. According to Tuchman, the DES has two main parts: an algorithm (a set of rules for making calculations or, in this case, for encrypting a message) and a 56-bit key.

Tuchman likens the algorithm to a safe and the key to the combination. "But don't get carried away by that oversimplified analogy," he warns. "I'm not talking about a safe that Johnny Lightfingers can crack by turning the combination dial until he hears the tumblers click. I'm talking about the kind of safe that even the designer can't crack because he doesn't know the secret key or combination number.

"To my knowledge, this is the first time in the history of cryptography," says Tuchman, "that a high-quality algorithm has been put on a single LSI chip." The chip measures approximately .2 x .2 inches and contains the logical equivalent of more than 3,000 "NOR's" (logical elements). Everybody knows the algorithm, but can't decipher the signals without the key. The beauty of the DES cipher is that there isn't one key, but more than 70 quadrillion of them.

"Think of the key as a string of 56 zeros and ones," Tuchman says. "You can arrange those zeros and ones

in any order you choose. Your options are fantastic!''

(To be exact, they amount to 72,057,-594,037,927,936 possibilities.)

Questions about the adequacy of the 56-bit key have arisen in academic circles and the trade press. Some critics claim that a much larger key is necessary to protect the encrypted data from a ''brute-force'' attack—that is, trying all possible key combinations (all 70 quadrillion possibilities) on a super-fast specialized computer.

The National Bureau of Standards held a workshop on this subject, open to manufacturers of central processing units, cryptography and data processing experts. The purpose was to estimate the cost and viability of the approach. The conclusion was that the cost and size of such a machine, through the 1980's, would be prohibitive.

As to the key length, it has been studied in great detail by specialists inside and outside IBM. Their consensus is that 56 bits is quite adequate for most commercial applications today and, if a specific application does require additional key length, the same effect can be provided properly by encrypting the data twice. They further note that the DES, like all Federal standards, comes up for formal review on a regular cycle. If actual usage reveals a significant requirement for a longer key, the standard can be modified with little difficulty.

If, by the way, the brute-force method worked, only the one key used on that particular piece of data would be compromised. There are unique keys for each data stream as well as a frequent change of master keys.

All of which bears upon Dr. Branscomb's point: A good encryption is one that's more trouble to solve than it's worth the effort to do so.

''The choice of the key length,'' says Branscomb, ''was a question of balancing simplicity of use and economy of implementation against the amount of effort required to decrypt the message. I believe a 56-bit key is more than adequate for commercial applications.''

Indeed, a prime market for those products is corporations that send proprietary information all over the world. Sometimes the data is sent over communications lines; sometimes it is physically transported on disks or tapes. Either way, with the new IBM devices, the data becomes unintelligible to anyone who doesn't possess the key. □

Richard Bode writes extensively about technology and business.

At Poughkeepsie, the big ones

Right on schedule they roll out the door

The ''big bombshell'' of IBM's 1977 spring product announcements—that's how *Datamation* pegged it when the company announced its powerful 3033 processor. It was called a bombshell because it's up to 1.8 times more powerful than a System/370 Model 160-3 and provides new price/performance levels. It has denser circuitry and takes half the space. That spring ''bombshell'' was followed by similar pyrotechnics last fall, with the announcement of the 3032 and 3031.

Those three new processors started rolling out of the Poughkeepsie, N.Y., plant on March 17. ''Thanks to a big overtime push and excellent site teamwork by everyone concerned, the machines were right on delivery target [end of first quarter, 1978],'' says R. F. Boedecker, vice president of the System Products Division and general manager of manufacturing, Brooklyn/Kingston/Poughkeepsie. It was, he adds, ''the first time that first customer shipments of three large computers took place on the same day.'' Processors and programming for the new ''Big Three'' machines were developed at SPD's lab in Pough-

keepsie and are being built at its plant there; their advanced components are out of SPD's East Fishkill facility.

In the first shipments, a 3033 went to the Singer Company in Wayne, N.J., a 3032 to the U.S. Air Force's Data Services Center in Washington, D.C., and a 3031 to The Credit Life Insurance Company in Springfield, Ohio. According to Herbert D. Lechner, vice president, systems and administration for Singer, more than 80,000 jobs are processed each month at the company's data center in Wayne. The new system, he says, will immediately provide greater capability for meeting the company's data processing requirements.

Colonel Phillip J. Wendt, commander of the Air Force Center in the Pentagon, says that its 3032 will be used essentially to prepare and process complex simulation models. At The Credit Life Insurance Company, says David Halley, senior vice president, the new 3031 will help meet a pressing demand for individual customer service, created by a recent annual growth rate of 20 percent. □

The giveth and taketh away

If financial statements turn you off, here's one that may not. A quick,

Here's what came in

Gross income from worldwide IBM operations amounted to $... million in ..., an increase of $... million over .... Data processing accounted for $... million of it; office products, ... for $... million; Federal Systems, for $486 million; and other income, $58 million.

A geographical view of that same gross income

Of the $... million, the U. S. economy accounted for $... million; Europe/Mideast/East/Africa, for $6,391 million; Americas/Far East, $2,734 million.

Take away the cost of doing business

The cost of ... costs ... and services, and ... came to $... million, leaving $... million.

easy-to-read summary of the company's performance for 1977.

Add, as income, the interest earned on company holdings

This came to $475 million, primarily in interest on marketable securities. This in turn took up to $6,100 million. These were the company's earnings before income taxes.

Take away for income taxes

The provision for U.S. Federal and non-U.S. income taxes amounted to $2,479 million. Earnings per share after taxes of $7,718 million. These net earnings after taxes were up $321 million over the previous year.

Payout in cash dividends to stockholders

Last year those cash dividends amounted to $1,445 million to the holders of 148 million shares. What's left then goes back into the business.

by Claire Stegmann

BUMPER CROP

The rookies of this year's Hundred Percent Clubs.

Atlantic City's Traymore Hotel is gone, its twin Byzantine domes toppled by a wrecking company in 1972. Gone, too, are many of the 52 Go-Getters who gathered there on the boardwalk a half-century ago for the first company-wide sales convention.*

On the special train out of North Philadelphia that second Monday in January 1925, the salesmen spent their time ragging one another as to whether butcher scales, time clocks or punched card tabulators were harder to sell.

Homburgs in place and starched collars snowy white, they were welcomed to the IBM showroom on the boardwalk by President and General Manager Thomas J. Watson, Sr., who would head the company until his death at 82 in 1956. Next day, it was on to Manhattan to take in the sights. But before they scattered at week's end, the Go-Getters had voted unanimously to dub their annual gatherings the IBM Hundred Percent Club.

The "IBM" was new. The company had changed its name only the year before from the Computing-Tabulating-Recording Company to International Business Machines Corporation. Thomas J. Watson, Jr., was then ten. Many years afterwards he was to recall the event, remembering that he thought it an awfully big name for a company that was then pretty small potatoes. It had approximately 3,500 employees, about a quarter of them in Endicott, N.Y., although card plants had already been established in Washington, D.C., and in Canada, Germany and France. In 1925, the company paid its first stock dividend: 20 percent.

From Atlantic City, the club moved on, first to New York's Pennsylvania and New Yorker hotels, then, in the 30's,

to the newly opened Waldorf-Astoria on Park Avenue.

In 1939, the club celebrated a special IBM day at the New York World's Fair, and did an about-face the next year, when it convened in a specially built Tent City, just outside Endicott. With time out for World War II, when no clubs were held, the Tent City conventions lasted until 1950, with as many as a thousand salesmen at a time easing the camping out with such creature comforts as running water, electric lights, telephones, gas heaters and a specially published daily newspaper.

The main tent was half the length of a football field. Marching bands opened the meetings. The speech-making was fervent. And there were fireworks to cap the evenings.

Times have changed, and the style of the clubs has changed with them. In some cases, even the name is different: In the Data Processing Division, meetings are now called achievement and leadership forums. There are fewer speeches, and more discussions by outside experts on subjects such as education and energy. And the clubs are more eye-filling, given today's often dazzling audiovisual techniques.

But speakers and award winners still sprint, not walk, to the platform. And there's still the sense of special excitement for those making the club for the first time.

Here are nine of them.

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* Some records point to 1915 as the start of Hundred Percent Clubs, when the company was still known as the Computing-Tabulating-Recording Company. However, they appear to have been held separately for the several different sales forces. So far as we can establish, the 1925 meeting was the first for the company as a whole.

14
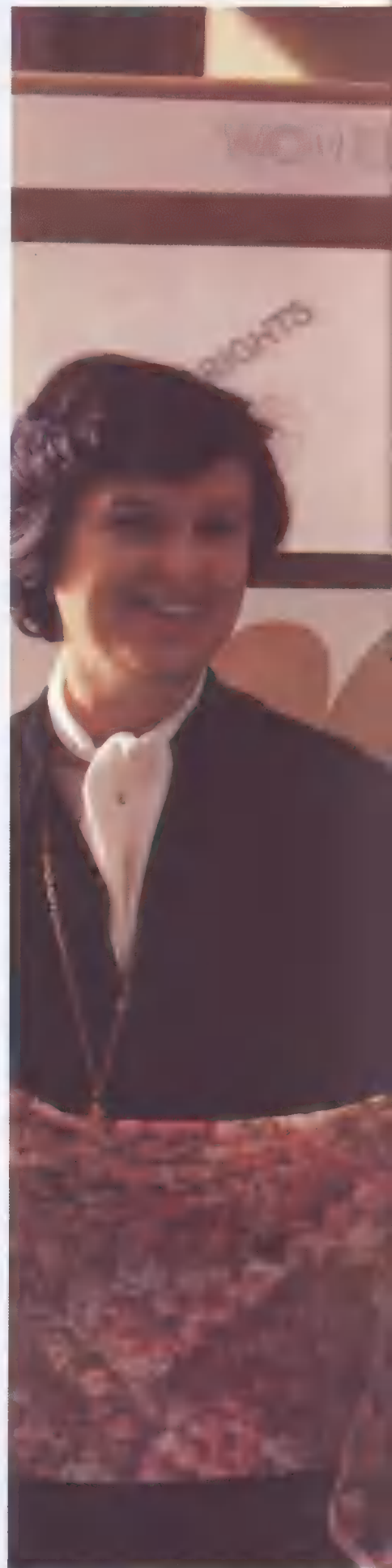
He was a stockbroker selling dreams. Machines, he says, are better. The competition? "First rate." But it adds to the zest of the job.

A stockbroker for seven years before joining IBM in October 1976, Ralph Iannelli, who works out of the Office Products Division's New York Central office, finds "selling something tangible a lot easier than selling dreams. There are no sure things in the stock market, but you can see a piece of equipment working for you every day." He made the Club in June and, by year's end, had made double his quota.

Business looks just as good this year to OPD's 1977 rookie of the year. He's aware, though, that the competition is getting tougher. "A lot of larger companies," he says, "are putting more capital into the industry and stepping up the quality of their products and sales people. So we're not about to get complacent."

Iannelli's walking territory is in midtown Manhattan, not far from the apartment where he and his wife live. His first sale, to a travel agency, came early in January and "was pretty important to me psychologically. I had spent weeks in sales training school in Dallas getting

"If an account doesn't see you two or three times a month, they may think you've forgotten them," says OPD marketing rep Ralph Iannelli, visiting here with Liz Esposito, supervisor of the Celanese Corporation's law department.

ready and was anxious to start earning my keep.''

Although he sells to the legal departments of a number of large companies, he by no means confines himself to the lawyers. ''Once an office system is up and running,'' he says, ''and people elsewhere in the company see what it can do, they begin to use it, too, so it gets filled to capacity rather quickly. Then it's up to you to show other departments how they can use one of their own.''

He often takes customers to an IBM demonstration room or to other accounts to show the equipment in running order. ''Prospects are sometimes apt to think a salesman is biased,'' he says, ''but they can't argue with performance.''

To Iannelli, 80 percent of salesmanship is service—making calls on accounts to see that things are running smoothly and to reassure new operators. ''If the account doesn't see you at least two or three times a month,'' he points out, ''they think maybe you've forgotten them, and that's bad.''

He tempers legwork with judgment. ''I'm all for enthusiasm, but often sheer energy can be counterproductive. A little account planning, some research, having a goal and plotting your way toward it can sometimes make three visits pay off where fifteen wouldn't if you were less prepared.''

Maturity has also brought with it an ability to take the good with the bad. ''Salespeople,'' he says, ''particularly the very young, can easily become dejected. One day you hit a home run, and the next day you strike out. You just have to say to yourself, well, I'll do my best, and at the end of the year, we'll look at the results.''

When that surefire sale fell through, qualifying seemed a long way off. It wasn't. She kept plugging, and by October, she was home free.

Judy Hart has, so to speak, a friend at court. The Minneapolis Office Products Division systems sales rep is married to a Minneapolis Data Processing Division marketing manager, with whom she can talk shop and seek advice.

She, too, was an IBM manager, in administrative operations in Milwaukee, for four years before she left the company in 1972 to have her second child. On her return, in the summer of 1976, she wanted a new kind of challenge and opted for sales. ''I felt I understood the job as well as anyone who goes into it,'' she says.

She was the second sales rep in her branch to make the Club last year, qualifying in October. ''Just about the whole office celebrated with me. After that, it was everyone working together until the entire branch made it. We had a big fourth quarter.''

As an office systems sales rep, she sells magnetic media products and systems, composing products and dictation equipment. Her biggest customer is General Mills. ''They have a word processing center in their consumer response area, and my first sale was two 6/430 Information Processors.''

Most of Judy Hart's other customers are first-time users—small manufacturers, computer software companies, consultants and one rare-coin broker who recently bought a System 6. She juggles her time between developing new business and ''closing out the old.'' A quarter of that time, she estimates, is spent in seeing to it that customers are making the best possible use of what they are paying for.

She recalls one low point in her highly successful year. ''I had sold an order, and about two months later, before it was installed, it was canceled. That was the first time, the only time, that happened to me. I spent a month and a half trying to save it, finally admitted it was never going in, and went out and started working on something else.''

She sees her daughter off to nursery school and her son on the school bus before she leaves home in the morning, and she tries to return by six o'clock at night. Most of her accounts are in suburban areas within easy driving distance of her home.

She credits her husband with helping her to think through a problem and to listen effectively. ''Most of us,'' she says, ''have a tendency to talk too much. We're so busy selling that we don't always hear what the customer is telling us. It really pays to listen.''

One of the first things he learned—never bad-mouth the other guy. He didn't; and because he didn't, he walked away with the order.

By the time he finished General Systems Division sales school last June, Jim Rutherfoord had already made 25 percent of quota. ''Of course, one of the two 5100s I sold,'' he admits, ''was a bluebird. Bluebirds are orders that just fly in the window.'' Rutherfoord reached quota in early fall and set about helping the New Orleans branch as a whole. ''Toward the end of the year, it got pretty exciting,'' he says. ''A lot of our sales were one-call closers. They had to be. We just didn't have time.'' He finished the year with better than three times his quota—32 computers sold, 8 installed—an individual record that made Rutherfoord one of GSD's top rookies of the year.

Then the New Orleans branch was reorganized and a Baton Rouge branch created. Rutherfoord was transferred to Baton Rouge. His territory, which remains essentially the same, overlays that of the new branch. ''A seven-hour drive from one corner to the other,'' it extends from Baton Rouge to Beaumont, Texas, up to Shreveport, and into southern Mississippi. It keeps him away from home days at a time, so his wife and two young boys are accustomed to seeing him mostly on weekends. ''Right now I'm working some very long hours,'' he says. ''But it's like any other good investment. The more you put in, the better your future.''

His customers run the gamut from manufacturers and distributors to professional consultants, CPAs and government. Though he specializes in 5100 and 5110 computers, he works closely with those who sell other GSD products. ''It was suggested at sales school that we try concentrating on one customer set, but that hasn't worked for me. I get leads from everywhere. Then, too, if you look down the road, in order to keep selling computers, you need installed references, and I'd rather have them installed in every type of industry.''

Rutherfoord believes in teamwork for another reason. ''When you have an-

other rep in the room," he says, "he can be thinking while you're talking, and the other way around. So together you can cover all the customer's questions."

As a new salesman unsure of his limits, he quickly saw the merit of "keeping the conversation positive. I remember one customer in particular. He made a point of telling me I got the order because a salesman from another computer company said some bad things about IBM. But he recalled that I had refused to discuss competitive products. That taught me a lesson early in the game."

Right now he's been asked to come up with a comprehensive sales program for the 5110 in the new branch office, and he is traveling with other reps to help them get started. "I've been told, in effect, my job is to eliminate my job. By midyear, I'll be on to something else."

She's working a territory straight out of Budd Schulberg's waterfront. How's she doing? Just fine, thank you.

Working out of the General Systems Division's Lyndhurst, N.J., branch office, Ellen Hansen, 21, had been on quota for two months. So far, she hadn't a nugget to show for some hard sales prospecting among the warehouses and small apparel manufacturers and distributors that line the Jersey side of the Hudson River, from North Bergen to Hoboken. On this particular May day, her target was an industrial supply manufacturer whose business, she felt, needed a System/32. But the president was out, and his secretary suggested she call back next day for an appointment. Disappointed, she did. "After about an hour's conversation on why a System/32 would be good for his business, the president said, 'Okay, I'm ready to order.'

"I didn't even have a contract with me," she recalls. "Believe me, I've never been without one since."

After that, sales picked up. In August, she recalls, "things really started popping." By year's end, she had sold, among other things, six System/32s and six System/34s, for a fifth again of her

sell quota. More important, she had opened nine new accounts.

"My territory is quite rough," she says, "and when prospects hear there's a woman computer salesman outside, they become curious. Most women avoid the area. Once I get in, the next step is to convince them I know what I'm talking about."

When sales reps in Ellen Hansen's branch office sell a new account, their pictures go up on the wall. She works hard at seeing hers there each month.

Her first year has taught her to ration her time more profitably. "I looked at the record and found that the most calls I had made on the accounts I sold were four. I made a lot more calls on other accounts, but they didn't pay off. My time would have been better spent elsewhere."

Her work goes in cycles. Ideally, she would like to "make things as steady as possible. I think that's what a good salesman does, but that takes time. Right now my plans are to do a better job than last year. And that looks very, very possible.

"One of my prospects told me once, you really seem to love your job. I do. I think my enjoyment, my enthusiasm, is probably the biggest thing I have going for me."

For this freshly minted MBA, it was a new world, with no one to hold his hand. Not that he needed it. He did nicely with a little "hugging" of his own.

Bruce Moore, fresh out of Stanford Business School in the summer of 1976, with a brand new MBA, was looking forward to his new job with what he had heard was "the best management and sales force in the country."

After he joined the San Francisco branch office, the first customer Moore chose was a small aerospace company that designs electronic counter-measure systems for fighter planes. DPD had not been doing anything with them for two and a half years. "That appealed to me," he says. "I'd be starting from ground zero, a brand new face on a brand new track."

New, yes, but the track wasn't smooth.

Moore found he had to make appointments to get in the door. "When I did get in, they would ask me a technical question I couldn't answer. So I'd have to get the answer and come back. But even though initially there were few signs of a business potential, I treated them as if they were one of my best customers. If they wanted a manual, I'd get them a manual—that same afternoon. If they wanted an update on technology, I'd arrange a tour through the San Jose plant to show them the 3800 laser printer and 3850 mass storage device. It's what we call 'hugging them a lot.' "

The hugging paid off. Moore sold and installed a System/370 Model 148, with 3350 disk drives and a 3203 printer, to finish out the year at two-thirds again over quota.

"What really turns me on," he says, "is finding applications that can increase productivity and help your customers make more money. If you do that, it sort of follows naturally that they'll put your hardware in to drive those applications."

Moore found an unexpected ally in the firm's Management Information Systems director. "It was the first system he was in charge of that he had to justify to his top management. And it was the first large system for which I had total marketing responsibility. After each hurdle, we'd celebrate together."

Moore is working with retail customers now and is helping a large department store install its first IBM system. "After that, there's a drugstore chain here that I think could use some attention."

From the Philadelphia 76ers to Buffalo—and computers. How one basketballer made the switch and burned up the court his first year.

"It took a lot of running."

Greg Baldwin, 25, describes his first year as a Data Processing Division salesman (almost twice his quota; regional Club director) in the idiom of the sport at which he excels. He was a champion basketball player for Pennsyl-

There's no fudging on performance—not when you're a sales rep. The figures won't bend. You either make it or you don't. But when you do, there's no feeling like it.

On his first account, San Francisco DPD salesman Bruce Moore, left, found an ally in Pete Cremidas, Management Information Systems director at Applied Technology, a division of ITEK Corporation, in Sunnydale, Calif.

"My product is not the least expensive," says Chicago IRD salesman Mike Clark. "So I sell value, and my customers seem to recognize it when they see it."

Above: "My territory's rough," says Ellen Hansen, GSD marketing rep in Lyndhurst, N.J. "When prospects hear there's a woman computer salesman outside, they become curious." Here she visits ▪ fuse company's factory on the Jersey side of the Hudson River.

One of Jim Rutherfoord's first orders was a "bluebird." It flew in the window. But it hasn't lulled the GSD salesman into taking anything for granted. Here he visits with Jimmy Judice, right, president of Judice Electric Motor Company in Lafayette, La.

In marketing they'll tell you marketing is what makes the world go round. At any rate, two things are certain. Until there's an order, there's no backlog in the plant. Until installation, no revenue comes in.

Right: "One of the biggest challenges facing first-year people is credibility," says Greg Baldwin. Here the DPD Buffalo, N.Y., marketing rep visits a customer's clothes cutting factory.

Above: "You have to overcome the tendency to talk too much," says Judy Hart, OPD Minneapolis marketing rep. "It really pays to listen to what the customer is telling you."

Left: "There are so many people to talk to. It takes a lot of work to get a contract," says Tod Tantum III, FSD marketing rep in Gaithersburg, Md.

Right: "The last thing I wanted to be was just another salesman," says Ki Rin Kim, SRA's New York area college associate. He treats customers like Dr. Gerald Ramsey, a department chairman at Hofstra College in Long Island, as friends.

BUMPER CROP

vania's Lafayette College, and he interrupted his IBM career to try out for the Philadelphia 76ers professional basketball team. He lasted a month and a half before being cut and returning to the company.

Even in college, Baldwin knew he wanted to work for IBM. He kept in touch with the IBM branch manager in Endicott (a basketball fan), and when he was ready to graduate, he contacted him and was offered a job in Buffalo. "I wasn't too thrilled," says Baldwin, "because of the chilly weather. But I took a trip up, met the people and really liked it, right from the start."

He started quota in January 1977, worked about a month, then went away to manufacturing applications school. "I had heard some horror stories about how the marketing rep goes away on a two-week vacation, comes back, and the customer has his system out the door. Even though they could have been exaggerated, I wanted to make sure nothing like that happened to me. So I kept in touch with my customers."

Particularly with a medium-priced suit manufacturer, M. Wile & Company, a division of Hart Schaffner & Marx. "They had a 148 on order, and we were trying to get them to look at a 158." Baldwin submitted a financial proposal in February ("I have to give my systems engineer a lot of credit; he helped with the financial analysis."). In March, the customer decided to go with the 158. As a result, says Baldwin, "I made my sell number by spring. But another part of making quota is getting the system installed, which, in this particular case, proved no easy task. I didn't know I had the Club in the bag until December 31."

Baldwin also installed, in the same account, a 3790 distributed processing system. That took some hard selling because it led the customer into a more complex environment. "I'd say one of my toughest challenges," he says, "is the one that faces all first-year people, and

that is building up credibility. Making the customer feel that, when you make a suggestion, you've got some logic and justification behind it."

He still plays basketball two or three times a week. "The body has to be physically fit for the mind to operate properly. I want to be the best I can possibly be, just as in school I wanted to score the most points.

"My immediate goal is to be a branch manager. To me, that's one of the best jobs in the company. Of course, you have to live with the decisions you make, but you get the chance to call your own shots."

Follow in his father's footsteps? Not easy. Now he's making his own mark. In as tough a marketplace as you will find.

Tod Tantum III spent the first three years after graduation from Ohio's Bowling Green State University trying to avoid his father's footsteps. They seemed so big. In 25 years as an IBM salesman and branch manager, "Ace" Tantum (Horace, Jr.) had racked up more Clubs than the younger Tantum cared to count, and his Golden Circle pin was heavily engraved, both front and back. "I decided I wasn't going with IBM," says his son. "So I joined a smaller company. But it didn't take long for me to realize I was wasting my time. Smaller companies have problems, too. So, when Dad told me FSD was interviewing, I jumped at the chance."

Tantum joined the Federal Systems

Division personnel department 10 years ago in Gaithersburg. Years in management development and administration followed. Then, just over a year ago, he went into sales. "That's what I had wanted for quite some time," he says, "but those earlier years were my training ground. I just don't believe that anyone who's not familiar with how the Government works or how FSD operates and how it sells can come in and market to customers like ours. There are so many people to talk to, even on one procurement. And after the RFP (Request for Proposal) hits the street, it takes a lot of work to get the contract."

In his first year. Tantum came in comfortably over 100 percent. "It's a different world from, say, the Data Processing Division. Every FSD sales rep has at least a million-dollar quota."

He sells Command and Control software systems to the Department of Defense. Command and Control "is a term with a lot of meanings," he explains. "Mainly, it has to do with how upper echelon commanders—the decision makers—use massive amounts of data in allocating their forces. Most of the time, we're selling an idea, a better way to do something. It's total systems work, rather than just picking a piece here and there."

He works with highly technical people. "Right now, I'm involved with a Navy request for advanced analytical software architecture."

Competition is always rough. ("There are so many good competitors in the Federal marketplace.") And some circumstances are beyond anybody's control—take occasional budget cuts, for example. But Tantum is exactly where he wants to be.

"Each problem is unique," he says. "So is each customer. You never stop learning on a job like this."

He has 1,100 customers on Chicago's South Side. His clincher in every sale? Value. His customers know it when they see it.

The only thing Mike Clark misses about his seven years as a high school teacher (economics and business law) is his

extracurricular activity as a varsity football coach. He gets an occasional game of golf in on weekends instead and is "tremendously happy" selling cards, paper, ribbons and data modules (or disk packs) for the Information Records Division to a territory of 1,100 customers on Chicago's South Side.

Those customers are mostly big steel manufacturers but also include large national companies and several universities. Together, their purchases put Clark in the Club in November, with almost half again his quota. Admittedly, he had a head start. He went on quota in September 1976 and had fallen only a few points short by the end of that year, so he knew the territory.

IRD sales representatives work closely with Data Processing and General Systems Division representatives, systems engineers and field engineers. This relationship really helps when it comes to data modules, those storage units that can be used with a System/370 or a System/3, and Clark did especially well in closing this type of business. One customer, from whom he had anticipated an order for six modules, surprised him with an order for 23.

Clark lives with his wife and five children in Glenwood, Illinois. Sometimes he has to go into the city to visit the office, but most days it's straight to his territory. "Because a number of IRD products are consumed and reordered," he says, "it's very important to have a good, long-term relationship with customers.

"Just because our products are consumables doesn't mean they're simple to make. Take a continuous form card, the kind usually run on a high-speed printer to produce payroll checks. The process required to cut, perforate, print, number, punch, collate and attach long-grain cards into a continuous form is complicated and time-consuming.

"Or take the data module. It weighs 19 pounds and is only a foot and a half wide. But it can store up to 70 million bytes of information."

As with most IBM products, Clark points out, "ours are not the least expensive. So I sell value, and my customers seem to recognize it when they see it."

Give up San Francisco for the hurly-burly of New York? Not smart, you say. Wrong. For this SRA rookie, it meant winning big in a tough town.

It took Science Research Associates three times to make Ki Rin Kim do "the unthinkable—forsake San Francisco for New York." On the IBM subsidiary's third try, Kim gave in. "I was impressed with the management team," he says, "so here I am."

A former Chicago regional manager with a large New York-based publishing house, Kim had moved to San Francisco two years earlier to help boost the sales of a small publisher with a chronic case of low profits. Within 24 months after his arrival, sales had grown by $2 million.

Once he decided to try his skill with SRA college products, Kim moved quickly. "I had to," he says, "because spring was approaching. March, April and May are the three months in which 80 percent of sales in college texts are made." He arranged to operate out of a friend's Manhattan apartment until he could find quarters in New Jersey.

Then he took a calculated risk. He decided to focus on three SRA college products—texts in psychology, data processing and English. And he singled out, among the 90 schools in his New Jersey, Long Island, Brooklyn and Queens territory, those with large enrollments and big revenue potential.

"I knew that college professors are constantly bombarded by representatives in the publishing business," he says. "The last thing I wanted to be was just like any other salesman. So I took my time, got to know my clients, and brought in product information only when the occasion presented itself."

Indeed, he established such rapport with his academic prospects that they sometimes invited him home for dinner.

In what is generally viewed as one of the toughest SRA territories in the country, Kim slipped in over quota—an achievement made all the more impressive by the fact that his working year began on February 28, the day after he flew to New York from San Francisco.

Superstar. After 25 clubs and 16 Golden Circles, Pete Adams is still going strong. What about all those new kids? "The finest I've seen."

"Each year the numbers get bigger and the road gets rougher. That's what keeps it exciting." For superstar Pete Adams, veteran of 25 Hundred Percent Clubs and 16 Golden Circles, qualifying is an anticlimax. He likes the struggle.

In 1977, this Chicago branch manager, DPD Commercial, and his blue-chip team of 100 sales reps, systems engineers and administrators met a record-breaking 1977 quota. Meeting quota is a habit Adams acquired as a rookie salesman back in 1951. He remembers vividly the day he qualified for his first Club.

"I was in Howell, Michigan, some 50 miles from the Lansing branch office, and I got an order from an insurance company for 10 or 15 keypunches. I didn't dare call my manager—it cost money to phone. So I hurried back to the office and practically threw the order on his desk."

During the next seven years, Adams sold everything from keypunches to the large general-purpose 650 system. His biggest order replaced an entire competitive data processing installation. In recent years as a branch manager in Minneapolis and Chicago, he's helped develop hundreds of young people. "Last year's recruits and the new people training today," he says, "are by all odds the finest I've ever seen. They know where they're going, have a lot of dedication, and they're not afraid to work.

"Selling today takes more technical knowledge than ever, of course, but, in a way, it hasn't changed all that much. It's still a matter of knowing the customer's business, understanding your business and establishing a reasonable working relationship." □

Who's stalling?

Not IBM, says Katzenbach. In a riposte to the Antitrust Division.

What brought it on?

Again and again in his public statements, Assistant Attorney General John H. Shenefield, since 1977 head of the Justice Department's Antitrust Division, has been complaining about the procedural problems of "big case" antitrust suits, as well as the delays in those cases.

The event that triggered the Katzenbach reply was an address by Shenefield before the New York State Bar Association on January 18, when the latter said, "... a rational monopolist, no matter how high its legal fees and other costs of trial, will almost always prefer the expense of litigation to the threat of lost monopoly profits."

To which Katzenbach retorted in a point-by-point recitation on how "gross mismanagement" by the Antitrust Division has protracted the IBM trial.

Was Shenefield pointing the finger at IBM in that January 18 statement? Now he says, no, adding that he has not "made any allegations whatsoever about the delaying tactics of IBM."

But he also acknowledges that he has pointed to the IBM case "as one of several current protracted antitrust cases that have correctly focused public attention on the failure ... to come to grips with the procedural problems of complex antitrust cases."

Was Katzenbach protesting too much as Shenefield now alleges? Hardly. Not when you remember that the Antitrust Division's suit, in the minds of most people, has become synonymous with "big case" litigation. And not when you remember that after seven years of preparation and three years of trial, the Justice Department has yet to end its case, IBM yet to begin. At any rate, in his reply, Katzenbach lets the record speak for itself. It may surprise you.

Letter to the Editor
New York Law Journal

John H. Shenefield, Assistant Attorney General in charge of antitrust, has used a number of public appearances to discuss problems of delay in "big cases." On each of these occasions—the latest of which was the annual meeting of the Antitrust Section of the New York State Bar Association on Jan. 18—Shenefield has used U.S. v. IBM as an example of such a case. Shenefield states that "real progress" depends upon finding "ways to deal with, first, the epidemic abuse of discovery and motion practice that has evolved, and second, the inability of many trial judges to get control of big antitrust cases and manage them to an efficient conclusion."

In seeking to focus public attention on alleged judicial mismanagement and on discovery as a conscious delaying tactic of defendants such as IBM, Shenefield misleads his audience. He knows—or, at least, should know—that responsibility for delay in the IBM case rests with the Department, not IBM. The major problem which Shenefield could and should have corrected is the Department's gross mismanagement of that litigation. However, that situation under his aegis is getting worse rather than better.

Thus, the harm of Shenefield's statements lies not merely in the falsity of the charges but in his apparent failure to be either realistic or fair about the true nature of the problem.

I suggest a plausible hypothesis of the basic nature of the problems. Where the Department is still trying to prove its case against IBM after more than two and a half years of plaintiff's evidence, it is because it hasn't got a case to prove. And delay—plaintiff's delay—could (again speaking hypothetically) be a substitute for political courage. The case has outlasted six

Attorneys General and four heads of the Division. So far the buck has never stopped.

Shenefield never states facts to support his allegation that IBM is responsible for the delay. For good reason. There are none. I am not similarly handicapped.

1. The Department filed its case on Jan. 17, 1969, the last working day of the Johnson Administration, after some two years of investigation. For the next three years, it did absolutely nothing. One may search the docket sheet in vain for any indication of any activity by the plaintiff during 1969, 1970 and 1971. During that same period we repeatedly pressed the Antitrust Division, the Assistant Attorney General and the Attorney General either to move forward with the case, to drop it, or to resolve it by settlement. Uniformly, they all responded that they did not know enough to do any of those things. In late 1971 the plaintiff changed lawyers and in 1972, after the Dita Beard—IT&T affair, then Assistant Attorney General McLaren announced that they would press for a trial. They undertook to do so primarily by relying almost exclusively upon discovery work done by private counsel in other cases.

2. On Sept. 26, 1972, Oct. 16, 1972, July 25, 1974, Dec. 5, 1974, and Jan. 15, 1975, IBM affirmed that it was prepared to go to trial. Each time the Department attorneys said they were not and sought further delay.

3. Since January, 1969, private treble damage suits covering the same issues as the Department's case have been brought. Trial in four such cases has been completed, appellate review in two is now complete, and a third (Cal-Comp) covering essentially all the issues in the Department's case is pending before the Ninth Circuit following a

directed verdict for IBM. IBM, incidentally, has won two directed verdicts at the close of plaintiff's case, one at the close of trial, and has yet to lose on the merits.

In each of the four tried cases, experienced plaintiffs' trial counsel have made relatively short work of what has taken the Antitrust Division thus far thirty-two months: in Greyhound v. IBM, plaintiff took twenty-six days; in **Telex** v. IBM, plaintiff took fourteen days; and in CalComp v. IBM, plaintiff took thirteen weeks to cover virtually all the issues covered by the Antitrust Division. In each of the four tried cases the plaintiff was represented not only by experienced, able counsel but by major law firms and counsel of outstanding, national reputation.

4. In January, 1975, the Department amended its complaint to include new and different allegations covering the period 1969-72. These allegations were prompted by the Telex decision against IBM in the District Court in September, 1973. That decision was not only unanimously reversed by the Tenth Circuit ten days after the government amended its complaint, but the court directed the entry of judgment for IBM forthwith. The identical issues were also retried in CalComp (dismissed at the close of plaintiff's case in February, 1977) and are being retried still again in Memorex, and both cases will be finally decided years before the Department's case.

5. Contrary to Shenefield's suggestions, IBM has not overwhelmed the Department with paper. It has, in fact, produced very few documents to the Department because Department attorneys have chosen to rely on documents produced to private litigants, reviewed by their attorneys, and selectively turned over to the Department. Whether this procedure is calculated to achieve the public interest in competition or the

private interests of competitors the reader may judge for himself.

6. Shenefield decries "the epidemic abuse of discovery and motion practice" and affirms the desirability of "firm schedules for discovery." Interesting. Discovery in the IBM case was supposed to end in June, 1974, by firm stipulation of the parties pursuant to an order of the court. However, new lawyers from the Antitrust Division substituted under Shenefield's administration —almost no one remains from the staff which started the trial—have simply put aside their predecessors' agreements and have sought successfully not only to reopen discovery of IBM's trial witnesses, but even to *redepose* people whose depositions were taken and completed three years ago. So much for Shenefield's "firm schedules." He must know that it is his subordinates who are the most seriously infected by the discovery epidemic.

7. By contrast, IBM deposed almost all of the 165 persons on the Department's witness list before trial. Since trial commenced, the Department has called only fifty of the original witnesses, added twenty-two new ones, and dropped ninety-five. IBM kept pace and deposed all of the new witnesses promptly. Incredibly, one of the things plaintiff is now doing is redeposing some of the very same persons we deposed three years ago because they were on the Department's witness list.

8. On at least three separate occasions, the Department estimated that its case would require only sixty days. It will have taken almost three years before it is finished. In the same vein, the Department's principal expert was estimated in June of 1977 to be four days on direct examination; after sixteen days, government counsel estimated a further two days, which turned out to

be fifteen more. Thirty-one days on direct examination—more than the total time used for all witnesses by Greyhound or Telex!

9. This is only a sampling from an unhappily rich vein. When confronted with the facts, the Department normally does not respond to them but instead throws up a smoke screen citing prominently what it calls IBM's "frivolous" claims of privilege, claims which Chief Judge David N. Edelstein has indeed rejected. Frivolous or not, however, these claims have not delayed the case one iota. Further, the same claims were presented in the other litigation and have, with very minor exceptions, been sustained by three Federal judges and two special masters.

Shenefield says it would be "relatively easy to solve the problem of unduly expensive and complicated antitrust cases if improving management of the Antitrust Division were the only— or even the biggest—problem." He is right in saying it is not the only problem. He is wrong in concluding it is not the biggest and that its solution would be relatively easy. Either he is unaware of the facts or feels he must continuously provide some plausible explanation for his Division's handling of the IBM case.

I hope Shenefield will now stop making these speeches where we have no chance to respond. And I hope the Presidential Antitrust Commission, on which Shenefield sits, will examine the conduct of the IBM case at length. I urge it to do so and it plainly has the opportunity to do so unless the Department feels it cannot stand the heat. □

Nicholas deB. Katzenbach
February 14, 1978

Nicholas deB. Katzenbach, IBM vice president and general counsel, is the man in charge of IBM's legal defense in the government's antitrust suit.

The ABC's of deferrals

How they work, what repeal could mean

Included in President Carter's tax reform package, along with abolition of the "three-martini lunch," is a measure that would repeal the deferral of U.S. taxes on income earned abroad.

It is unabashedly populist. It draws support from those who believe that tax laws tend to favor international companies. A myth, say the experts, and indeed the measure is generally opposed by those who know the tax laws best.

What would repeal of present tax deferrals mean?

Stay with us and see it through.

Take the XYZ Corporation. It earns $100 through its operations in a foreign country.

That foreign country might typically levy a 42 percent income tax on that $100 profit. Leaving an after-tax net of $58.

Now, suppose the subsidiary decides to send back to the U.S. company a 60 percent dividend on those net earnings. The dividend amounts to $35. Most foreign countries would levy an additional withholding tax on those dividend payments. Let's assume it's 10 percent, or $3.50 more in tax payments overseas.

Now comes the U.S. tax bill. Not on that $35 in dividends. But because of a procedure called "grossup," the company must include as taxable income not the 60 percent dividend, but 60 percent of those foreign profits before overseas taxes. So XYZ is liable for taxes on $60—not the $35 it actually received.

Still with us? Keep going.

The U.S. corporate income tax rate is 48 percent. Apply 48 percent to that $60 and get $29. But against that $29 due in U.S. taxes, you're entitled to a foreign tax credit. This is equal to 60 percent of the taxes paid by XYZ to that foreign country. Since it paid $42 abroad in income taxes, it is entitled to a credit of $25. Plus the $3.50 it paid in withholding taxes.

So the total U.S. tax credit comes to $28.50. And since your U.S. tax liability is $29, you wind up owing 50 cents in U.S. taxes on that foreign source income. Not much, you say. But you've already paid $45.50 to the country in which you earned the money.

Now suppose tax deferral is repealed.

On that same $100 in pre-tax earnings, you still pay $42 in foreign income taxes. You declare the same 60 percent dividend for remittance to the U.S. Or $35. And you pay the same $3.50 in withholding abroad.

So far everything is the same as before.

But now for the joker in the deck.

With the repeal of tax deferrals, you would now be subject to U.S. taxes on the full $100 you earned abroad—before the payment of foreign income taxes. Of the $58 left after the payment of those foreign taxes, you brought back only $35. But now the U.S. levy also applies to the $23 you left abroad for reinvestment in the business there.

So you now apply the U.S. tax rate to that $100 in earnings, and you get $48 due in U.S. taxes.

But, once again, the tax credit. Now it comes to the full $42 you paid in income taxes abroad, plus the $3.50 in withholding. Or a total of $45.50.

But now you would apply that $45.50 in credits against the full $48 in U.S. taxable income. And you wind up paying $2.50 in U.S. taxes. Not 50 cents as before.

In other words, in addition to foreign taxes, you end up paying five times as much to the U.S. as you did before repeal of deferral.

But don't be misled by the example. The difference between 50 cents and $2.50 may not sound like much. However, when you translate it into millions, it can also become the difference between $50 million and $250 million—or $200 million more.

No longer small potatoes. And no longer a triviality for U.S. companies already pushed hard to compete with home-favored industries overseas.

IBM has much to gain from the trade talks at Geneva, where delegates from 97 nations are getting down to hard bargaining to trim tariffs on some 5,000 items by 40 percent or more over an eight-year period. Some 40 nations have tariffs on computer products at least twice as high as the U.S. rate, which means that, while the U.S. market is virtually wide open to foreign competitors, U.S. computer firms still face considerable barriers overseas.

Also on the agenda at Geneva are the nontariff barriers to trade, such as the "buy national" computer procurement policies and practices of many countries. Progress here could be more important to IBM than the lowering of tariff barriers themselves.

"Some European governments have long had procurement policies favoring national manufacturers," says Kaspar V. Cassani, IBM vice president and administrateur, directeur general, IBM Europe. "These policies and practices often have the effect of excluding IBM, even though 90 percent of our product sold in Europe is made there. In fact, the European content of our products is often higher than that of some so-called national manufacturers. Virtually all our employees are European nationals, and we are one of the biggest taxpayers in Europe."

Besides the "buy national" practices of some governments, the EEC itself is encouraging all member state governments to give preference to European companies in public procurement decisions. The reason: to ensure the growth of a European-based computer industry.

In Japan, IBM has also received very little business from the central government. However, there are signs that the Japanese "buy national" procurement practice may be loosening. "We're taking a wait-and-see approach," says Figueroa, "on whether there is a fundamental change in attitude."

With strong protectionist pressures at home and abroad, time seems to be running out for meaningful progress at Geneva. "The best interests of the U.S.," concludes IBM Chairman Frank T. Cary, "are served by continuing to open up international channels of trade while working toward parity in tariffs and the elimination of other trade barriers. That's especially important for the high-technology industries, since they have the best potential for generating future development and jobs." □

Bob Hubner forsook it 37 years ago for a job with IBM. It's been allegro all the way.

Whenever one of the big dance bands of the late 1930's played Seattle, a tall, thin young man with thick glasses was apt to get the orchestra leader aside and sell him an original, fully orchestrated arrangement of a popular tune. The arrangements, which brought $30 or $40, were helping to pay the young man's way through college. He played saxophone and clarinet with the University of Washington's campus swing band and was considering a career as a professional musician.

When the woman he later married, a fellow student, objected to his playing music every date night, the young man took a part-time job with a bank, where he learned to use the relatively new IBM 801 proof machine. He got to know the IBM salesman, liked his style, his pride in product and company. Banking was a fairly new marketplace for IBM, and the ambitious student thought his banking knowledge would help land him a job as IBM salesman in the Seattle branch office. It did.

Nearly thirty-seven years later, Robert W. Hubner retired on March 31 as IBM senior vice president and member of the Corporate Management Committee. He is convinced that no career in music or banking could have equaled the excitement and fun he has had in a company that grew from $63 million gross in 1941, the year he joined, to the more than $18 billion in gross last year.

How would he characterize the changes he's seen in the company?

"We still hire intelligent, hard-driving, aggressive people," he says, "but we've had to learn how to manage ourselves more scientifically. There's more staff function to the business because of its size and complexity. That means an executive's relations with the parts of the organization he or she manages may be a little less personal today than it used to be, but it's difficult to see how this can be avoided."

After Army service in World War II, Hubner opened the Spokane branch office, then managed the Seattle branch and later moved up to be in charge of the northwest district.

He was invited into company headquarters in New York in 1956 as executive assistant to L. H. "Red" La Motte, then executive vice president. He became sales manager of the newly formed Data Processing Division in 1957 and, in 1959, executive assistant to T. J. Watson, Jr., who was then president and chief executive officer.
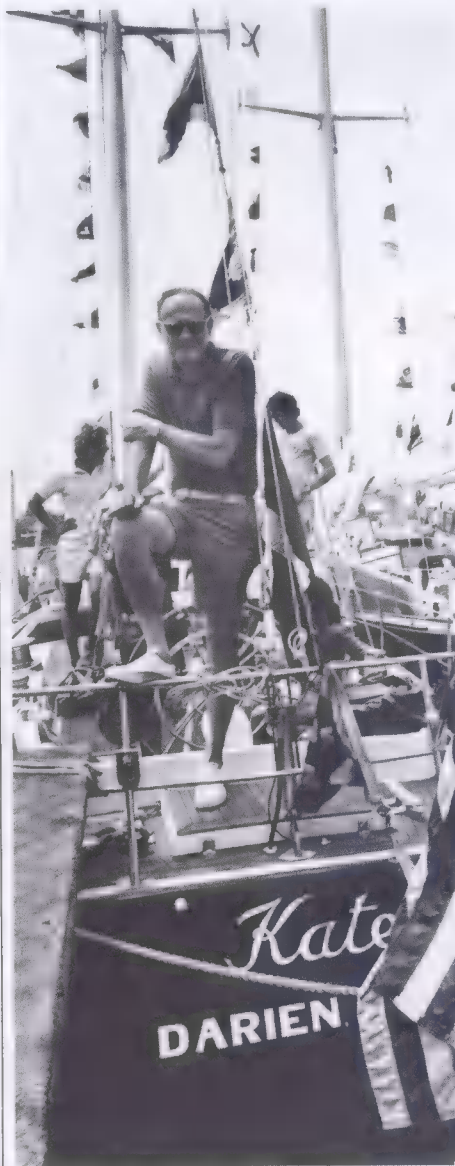
Moving on to IBM director and, later, vice president of corporate marketing, Hubner, in 1968, took over the General Business Group, which he affectionately referred to as "the IBM conglomerate." In 1972, he was elected a senior vice president and became a member of the Corporate Management Committee. He has been part of nearly all IBM's major decisions for more than 20 years.

"We will miss Bob Hubner's wise counsel on the CMC," says IBM Chairman Frank T. Cary. "His knowledge of the business, his experience and his keen mind made a substantial contribution to the success of the company."

"I'll miss the pace and the people," Hubner says, "but retirement at 60 fits well with my long-standing plans.

"My wife, Kay, and I have always enjoyed yacht racing, and we decided some time ago that we'd like to extend those sailing activities to world cruising when I reached 60."

Seven months ago, the Hubners bought a handsome 65-foot ketch that will serve the purpose nicely. But Hubner's days *off* the boat will be as busy as anyone would want, too.

In addition to serving as director of a number of corporations, he is also a member of Junior Achievement, the Urban Coalition and the University of Washington's graduate school of business. As trustee of the South Street Seaport, he is heading a major fund drive for the preservation of New York City's early maritime history.

At his retirement luncheon, March 31, Hubner said: "No one could fail to appreciate being on hand to see the computer grow from zero into a major industry. Or sharing that experience with the kind of people you only find in IBM.

"I leave your ranks both grateful and happy." □

Tom Clump is a customer engineer who doesn't like to be crowded. With a territory of 20,000 square miles in northeast Montana, he's not likely to be.

In the prairie lands of Montana, coal lies so close to the surface that in places it's part of the road beds. But until the jump in cost of oil and the new demands on natural gas a few years ago, Montana coal was judged too low-grade to compete as an industrial fuel. Not now. Millions of tons are being mined and hauled by train to the Midwest.

"This coal thing," as the local people refer to it, along with newly discovered natural gas and oil deposits, is leading to speculation that towns in the Yellowstone River Valley in eastern Montana may be "on the edge of boom."

Not all the farmers, cattlemen, bankers and owners of small businesses like the idea. Most of them, including an IBM customer engineer with the emphatic, no-nonsense name of Tom Clump, live in the remote prairie land because, as Clump puts it, "they don't like to be crowded." A boom could spoil the small-town life that has existed there for more than 100 years. And change the face of a landscape that is pretty much what it was when Lewis and Clark first saw it in 1805.

Clump has an understandable, proprietary feeling toward his territory, which encompasses 20,000 square miles of northeast Montana, bordered by North Dakota and Canada's province of Saskatchewan. He grew up in Glen-

He goes with the territory

Tom and Roberta Clump on their farm in Glendive, Montana.

dive, runs 20 head of Black Angus cattle on a 188-acre farm and travels 600 miles each week to repair and maintain machines at more than 20 IBM accounts. They include the small systems of the General Systems Division and the Burlington Northern Railroad's teleprocessing terminals that he handles for the Field Engineering Division.

To his customers, he has become as dependable and popular as a country doctor. Ask any of them, "Who's IBM here?"and the answer is always "Tom Clump."

Nothing underscores Clump's isolation so much as what is required for a *Think* reporter to arrange a day on the road with him. His region, GSD 7, is in San Francisco, 1,200 miles southwest of Glendive. His branch office in Salt Lake City is more than 600 miles south. His field manager, R. P. "Rich" Richbloom, whom he sees once a month on an average, is in Helena, 425 miles west.

Clump works out of a one-desk, single-room office that he shares with the Office Products Division CE, William Fricke. Both men are usually working the territory and have frequently gone for weeks without seeing another IBM employee, or one another.

If there's a problem Clump can't handle, he "calls in" to Helena, but generally, he inhabits a self-reliant world peopled by customers who have become his friends and gladly take messages for him. Indeed, word that a System/3 has "gone down" creates the neighborly concern one farmer experiences at news that another's prize bull is running a temperature. An answering service in Glendive takes Clump's messages and tracks him down in cases of emergency.

Much of the territory is formidable ground, and mutual assistance is less a mark of neighborliness than a condition of survival. There has been a lot to survive in the Montana plains. On the Little Bighorn River, a Yellowstone

by Harrison Kinney

tributary, Custer and his troops died in the Indian wars. During the fierce winter of 1886-7, 90 percent of Montana's cattle herds froze or starved. Droughts and dust storms through the 1920's and '30's drove farmers and businesses from the territory. Most of Montana's plains counties, in the eastern two-thirds of the state, continue to lose population. Many have fewer than 5,000 people and some fewer than 1,000.

This stubborn demographic fact stymied Clump's years of effort to get back to his hometown. After six years as an electronics technician in the Navy, he and his wife, Roberta, also from Glendive, talked of raising their three children on the Yellowstone instead of in Navy towns. He had heard nice things about IBM, he says, and once out of the service, applied for a job at the Spokane branch office in 1962. He was hired and assigned to Los Angeles.

He felt crowded in Los Angeles and asked for a transfer to Montana. In 1964, an opening developed at the Air Force base in Glasgow, Montana, and Clump was assigned to fill it. He was delighted. His additional assignment was to service the few unit record machines in 30,000 square miles that included Glendive, 150 miles southeast. At least he was able to visit his parents more frequently.

Then the air base closed in 1968, and Clump was moved to Missoula in western Montana. The Glendive dream seemed an impossible one now. There was no resident CE between Billings, Montana, and Bismarck, North Dakota, hundreds of miles away.

Two developments changed the situation.

In 1968, the railroad began installing an IBM teleprocessing system that linked St. Paul to Seattle. In Clump's old territory, the terminals were installed at Glasgow, Sidney, Glendive and Forsyth.

Second, was the new IBM System/3, which began to sell well in the territory. The System/3 sales and the terminals justified, at last, a resident CE in Glendive.

"When I got here in 1972," Clump says, "and word got out that IBM had resident service in Glendive, it helped open a few more doors for the salespeople."

Nothing about Clump's work changed when, in early 1974, GSD formed its new service force. He continued to handle the railroad terminals for the FE Division, and the GSD small systems. Given the choice, he decided to join GSD.

"With small systems, you're dealing face to face with someone whose whole business depends on what you're fixing," Clump says. "That weighs big with me. With the terminals, you're trying to make someone happy in St. Paul or Helena you've never met. It's important and interesting but less personal. As it is, I handle both product lines."

Flying into Glendive is a once-a-day adventure. The pilot of the small Frontier Airlines plane followed the Yellowstone downriver, northeast from Billings.

The temperature had dropped to 38 below a few days before, to be followed by thaw and another freeze. Salt isn't allowed on road pavement, and the single runway at Glendive was ice-rutted, which bothered the pilot not at all.

Glendive (population 6,000) is described by Clump as a combination farm and railroad town. It's inhabited by people with western hats, boots, jackets and jeans. Among them, Tom Clump, when he met the *Think* reporter in late evening, looked like an urbanite in suit, white shirt, tie and neat overcoat.

He is a quiet, thoughtful man, his glasses and high forehead giving him the contemplative look of a schoolteacher. He was politely curious about the visitor from the east. In his 16 years with the company, he said, he had never met anyone from Corporate Headquarters.

This evening, the matter most on his mind was the IBM 1050 terminal at the railroad station in Glasgow. The terminal was nearly 10 years old and awaiting conversion to the newer IBM 3770 terminal. Clump had made the three-hour drive to Glasgow that morning, spent eight hours on the 1050 and returned. The terminal was now receiving but not transmitting evenly. A Field Engineering CE was flying to Glasgow from Helena the next morning with a special diagnostic oscilloscope.

In a large territory, Clump said, it's important to keep one end of the territory "fixed" at a time, or you're on the road continually, increasing customer response time and travel expense. He was scheduled to fix a System/3 and the Burlington's 3770 terminal in Sidney the next day in the eastern end of his territory. Else he would have stayed in Glasgow to work with the FE customer engineer.

Show Clump a machine or any man-

Don't fence him in

"When I fixed typewriters in Manhattan, I could give customers service within two hours. Out here that's impossible. But my customers understand the problem. They have to deal with the distances and the weather, too."

William Fricke is talking. He's the young Office Products Division customer engineer who shares the small, unmarked IBM office in Glendive, Montana, with Tom Clump. He doesn't regret having persuaded his wife, born and brought up in New York City, to move to the Montana plains, where Fricke grew up. Neither does she.

Fricke worked out of the John Street office in lower Manhattan before transferring to Montana. Most of his accounts in New York were in one building.

"Usually those accounts contained 150 machines each," he says. "Here, there's one, two or three to a customer. In New York, just 37 accounts kept me busy. Here, even with 150 customers spread all over, I can regulate my schedule as if it's my own business. And I much prefer the wide open spaces."

Most of Fricke's machines are the Correcting Selectric. The OP salesman informs Fricke when a typewriter is supposed to arrive in his territory. Fricke calls the customer and asks him to let him know if there's any problem after delivery.

"The people out here are a dream to do business with," he says. "Recently one of our machines in the school system at Plentywood—a few miles from the Saskatchewan border—broke down, and I got the call. It was 200 miles away. When I got there, I found three other machines hadn't been working all that well either. The principal told me they'd been waiting for a typewriter to break down completely before telling me about the other three. He said he knew what a long trip it was for me, and he didn't feel right about calling me until at least one other machine got so bad it couldn't be used at all." □

made item, he said, and he sees in it something that sooner or later has to be fixed. People who can't do a lot of their own fixing are at a disadvantage in this part of the country. He doubts if he would have as nice a four-bedroom house on the banks of the Yellowstone if he hadn't built it himself, with Roberta doing the painting. With the price of beef down, he does his own doctoring of livestock, too, rather than call a vet.

The next morning, Clump was up well before sunrise. He pitched hay to the cattle and the two horses belonging to his daughters. He listened to the weather reports on the radio. Overcast and wind but no snow. Weather and distance determine his business schedule.

"It's easier today to be a CE—or, as in my case, a resident customer support representative," Clump said, as he swung his car onto Route 16, northeast down the Yellowstone toward Sidney. "Everything is geared to map charts—recipes, we call them. You just read down till you come to the trouble. Sometimes it takes time, and that's the only time I wish I had another CSR around who specialized in that particular machine.

"Distance is the constant problem out here. Getting places and getting parts as quickly as customers want them."

Ghostly shapes were taking form in the breaking daylight—sandstone bluffs; chimneys of stone sculptured by the weather; buttes, whose rose red and salmon colors relieved the monotonous tans and grays. The only trees were scraggly cottonwoods and aspens down by the Yellowstone, whose wide bends and turns were faithfully followed by highway and railroad.

It was below freezing, and Clump let the stretches of snow and ice slow down his car, speeding up where wind and sun had bared the pavement. The only danger to night driving, Clump said, was the chance that a deer would be standing in the road over the next hill, mesmerized by the headlights. Not long ago, Clump was returning from the Fort Peck Indian Reservation on the Missouri, where a System/32 helps the Assiniboine and Sioux Indians keep track of tribal business. West of Sidney he had come upon a motorist whose headlights had been knocked out in a collision with a deer. Clump had slowly led the way through the dark into Glendive.

A large snow-capped pile of sugar beets rose on the right. After being processed for sugar, Clump said, the pulp would be dried for cattle feed.
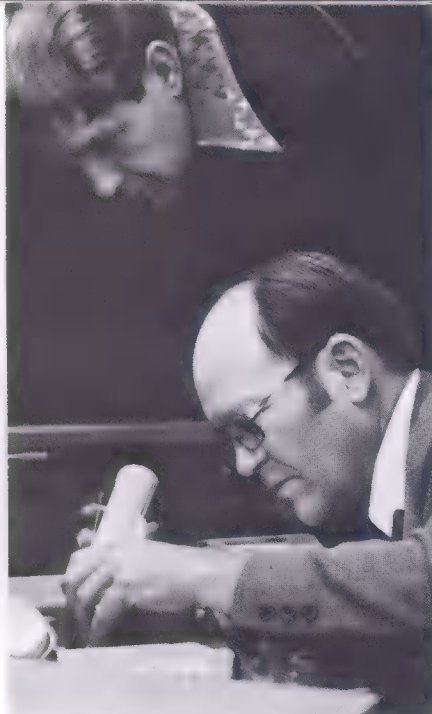
Tom Clump inspects a balky disk file at Farmers & Merchants Bank in Beach, North Dakota, while Irving Simonson, a vice president of the bank, kibitzes.

Much of it is shipped to Japan.

Sidney, more than an hour's drive from Glendive, is a town the same size as Glendive. Clump's first stop was Sidney Data Processing, a service bureau operation whose System/3 Model 10 was having a mild case of indigestion.

Clump was greeted with a backslap by the owner, a large young man named Terry Verhasselt, and smiles from the six women in the small computer room. Clump presented one of them with the jigsaw puzzle her son wanted and was unable to find in Sidney. She paid him for it gratefully. Clump occasionally acts as the Merry Mailman to help a customer employee.

Verhasselt provides data processing for numerous small businesses. Off-register punched cards were turning up in his file, and he watched carefully as Clump worked on the 5496 data recorder. Verhasselt represents the do-it-yourself Montanan who knows the need for self-sufficiency as well as anyone. After buying the System/3, he taught himself programming and limited maintenance and has learned some "hands on" techniques from Clump in case of emergency. He has his own meter and probe, and on a rare occasion, he may call Clump on a speaker phone that leaves both hands free to follow Clump's long-distance instructions.

"Probe Baker 04 or George 03," Clump may say to him over the phone.

The recorder fixed, Clump checked out the card reader, with Verhasselt

hanging over him again.

"It's not binding, or you'd be getting more than intermittent read problems," Clump told him. He made a few adjustments, tested and pronounced the patient cured.

He was replacing the cover when a call came in, answered by Verhasselt. "It's Irv Simonson at the bank in Beach," he told Clump. "His disk file just went down."

It was bad news, one knew from watching Clump as he listened to Simonson on the phone. He was to head back to Glasgow the next morning, and he had hoped to have the east end of his territory fixed by nightfall. He had yet to fix the Burlington's 3770 terminal in Sidney.

"Maybe it's the two cards we couldn't test out because they were missing from stock," Clump said to Simonson.

Verhasselt was listening sympathetically. "I can lend Irv those two cards," he said. "My file isn't going to be used for a while." Clump nodded and told Simonson, "Terry says I can borrow the two cards from him. I'll be down this afternoon."

A business has to stay flexible on the Yellowstone.

By 11 a.m., Clump was at the Sidney airport to meet the small Frontier plane hopping down the Yellowstone and coming in from Glendive with the parts he had ordered for the Burlington's Sidney terminal.

"I called the FE support center at Raleigh where the terminals are made," he said. "They had no record of a similar problem in their data bank. Nothing in the RETAIN manual offered a clue either, but I've checked the printer's wire matrix, and I'm sure it has to be the stepper motor. Raleigh wants to be informed on the trouble right away. I just installed that terminal six weeks ago."

The agent on duty at the airport, a young woman in jeans, pulled open the plane's baggage compartment and was soon handing Clump his package. He headed for the depot with the new stepper motor and the circuit card that drove it.

At the Burlington's old depot in Sidney, Clump was greeted with hurrahs from the three men on duty. He sat at the console of the 3771 and checked to see if the trouble had miraculously cured itself. It hadn't. After each line was printed, the paper was supposed to move up a line. It was either overspacing or partially spacing.

He began the motor transplant, watched closely by the Burlington "teleg-

Oh, those aching hospital bills

How one hospital in Tulsa is using computers to help ease the pain of what you have to pay.

by Edward F. Pierce

On the outskirts of Tulsa, Oklahoma, where cattle grazed not long ago, two Y-shaped buildings characterize the paradox of today's health care industry. The double-Y building complex, with its nine-story tower, is Saint Francis Hospital. Its facilities, like those of any well-equipped hospital, are the best money can buy. But it's taking more and more of that money to provide good health care for those who need it. The cost has, in fact, shot up half again as fast as the cost of living over the past decade.

In 1976 alone, for example, health care cost Americans a whopping $140 billion. For a family of four, that comes to about $2,500. In fact, health care consumed more than one dollar in twelve of this country's GNP, a figure that could exceed one dollar in ten by 1980, according to government estimates. Hospital care, the biggest expense by far, accounts for some 40 percent of the national health bill, or $56 billion. That's more than six times what it cost in 1960.

To put a lid on those escalating expenses, many hospitals have been turning to computers for help. Most of it has come in the bookkeeping/administrative area, but some hospitals are now using data processing equipment for speedier medical information and monitoring systems.

In the view of Donald Plant, assistant administrator of Saint Francis, the hospital's System/370 Model 138 (a larger system is on order) should hold down costs by helping the hospital to scale budgets quickly to the actual number of patients going through its doors. One example: When, three months into the year, patient volume was found to be substantially below projections, the hospital budget was revised within a matter of days with the help of an on-line financial planning and budgeting application.

An important benefit, of course. But top priority in the on-line system at Saint Francis is given to the swift and accurate communication of each patient's data to all hospital departments, showing where in the hospital he or she is at any given time.

Until Admissions went on-line, virtually all that information had to be retrieved physically from a central file area, just as individual blood samples had to be hunted down among racks and racks of vials. Soon the hospital staff will be able to use an IBM 3277 display terminal (there are 40 throughout the hospital) to quickly check a patient's latest lab results. This will be achieved through the installation of the IBM Lab Data Management System.

"The main advantage of this," says Vicki Krafft, lab data processing coordinator, "is that we're able to separate the clerical functions from the clinical ones and allow our people to concentrate on the latter. The savings on paper and forms alone can be appreciable. We estimate that in two years the software package costs will have been recovered by saving us approximately $11,000 annually on forms."

Besides recovering such costs, data processing equipment has been playing another role at Saint Francis. In the hospital's new Inpatient Care Tower, rooms are arranged in units surrounding a nursing station. The circular plan eliminates the long-distance care problem of patients at opposite ends of long corridors. At each of those nursing stations, a complete patient information center will be equipped with a 3277 terminal tied into the System/370.

Behind the scenes of all these center-stage activities is a special bypass operation—but not the kind that's written up in a medical journal. What they've been trying to bypass at Saint Francis is time—the time it normally takes to convert to an on-line data base computer system.

Six times what they were in 1960. That's the spiraling story of hospital care costs. The story is different at Saint Francis Hospital. Out there, a computer is helping to keep the lid on.

Normally, a hospital first installs one basic application. Then programs are written for other applications, which are phased in gradually—and often laboriously. That can take several years. But not at Saint Francis. Its first application packages, registration and admissions, were installed a year ago. Financial planning and budgeting went on-line last fall. The lab package is set for this spring. Pharmacy will be in by summer.

These five represent years of development work. "By taking advantage of the accumulated experience built into these packages," says IBM marketing rep Bill Slater, "after three years, Saint Francis will have a level of data processing sophistication that other major hospitals have been struggling to get after seven."

All that know-how is just as important to the hospital's Special Care Nursery, a neonatal unit in the Newborn Medicine department. It receives prematurely born infants from as far away as Kansas, Arkansas and Missouri, and it has a hot line to pediatricians throughout the region.

As Dr. George Giacoia proudly leads a visitor through his domain, he points to what are certainly some of the youngest patients ever to have their case records fed into the IBM Admissions Data Base. One now-thriving girl was brought in as a 26-week fetus weighing 1 pound, 15½ ounces, and yet miraculously breathing on her own. The nursery has received infants weighing as little as 20 ounces.

"The idea of premature-infant intensive care developed after the war as a strategy for lowering the infant mortality rate," Dr. Giacoia explains. "For a long time it was still pretty much of a wait-and-see operation, however, until technological advances made neonatal care more precise. Now the emphasis is on finding problems before they happen and on close monitoring of infants once they get to us. These fac-

tors make neonatology expensive, and the only economical way to offer these services is on a consolidated regional basis."

Like neonatology, the science of oncology, or cancer care, is an expensive and complicated one, demanding well-planned resources. "If you've ever seen a typical cancer treatment unit," says Robert Degen, assistant administrator in charge of planning, who directed the current $40-million expansion program, "then you know they're usually housed in hospital basements that have the look and feel of dungeons. We decided that ours was going to be a place of life, light, hope and confidence."

Blending physics with esthetics, Degen worked closely with Dr. David Gooden, a radiation physicist, and a team of architects and physicians to design the center around two primary needs: good patient flow and comfort. While the concrete walls in the four treatment areas are three feet thick or more, to prevent radiation leakage, there are fresh flowers and skylights, and the walls are brightly painted. In two of the rooms, a window, 13 layers thick and 9,000 pounds heavy, looks out on an outdoor garden. One technique in radiation treatment stems from a research project sponsored by IBM at Washington University in St. Louis: computer simulation of dosage to ensure that the correct amounts of radiation will be administered to patients.

Costs remain a constant concern at Saint Francis, which is nowhere near the high end of the national scale with its room charges. They are $79 a day for a semiprivate room and $87 for a private one. According to the Health Insurance Council of America, the average semiprivate room charge for hospitals in Los Angeles is $141, in Chicago, $144, and $210 in New York.

Lloyd Verret, the hospital's associate administrator, and Donald Plant recently talked about cost containment. Plant says it is difficult for a hospital specializing in crisis care—and Saint Francis tends to treat people who are acutely ill, often coming from other hospitals—to forecast its costs and manage them efficiently.

"You have to say in general that large hospitals are more expensive to stay in than small ones," adds Verret, "for the simple reason that this is where the most complicated cases wind up for treatment. But we needn't be defensive about our purpose. We are better equipped and staffed than the smaller hospital in a rural community, and we provide assistance to many of them through such services as our remote cardiac monitoring and other outreach efforts."

At Saint Francis, the general rise in cost to the patient for care is now 15 percent a year. Wages for the hospital's 2,600 employees are going up 8 percent yearly, supplies up 3 percent, and equipment another 6 to 8 percent. Dealing with new government regulations costs money, too: about $1-million in additional construction costs for the new wing, for example, to provide such items as sprinkler heads in closets.

Plant has his own view of the cost picture, shaped to some degree by his experience as a Presidential Interchange Executive in 1976, when he worked for the Department of Health, Education and Welfare—on the hospital planning law regulations.

"I've worked both sides of the fence," he says, "and as far as I'm concerned, there's really only one answer to containing costs: Be sure you're providing care only for those who really need it. One person coming into our emergency room with a simple stomachache sets in motion a sizable group of specialized personnel. He may have to have X-rays or other tests just for us to find out

that it's only a stomachache and not a hot appendix. We can't know until we look. And so we wind up staffing our emergency unit for all sorts of non-emergency needs, and that gets expensive.

"Up until now, though," he adds, "our charges have not corresponded closely with where our costs really are. We actually *lose* money on room, board and nursing, for example, and then have to make it up in ancillary departments such as X-ray and lab. Now the computer is going to help us move our pricing in the direction of the actual costs."

Cost reductions are built into the pharmacy application as well. Under the previous system, medication was delivered daily to the floors, along with dosage instructions. If a patient checked out at noon, however, the unused por-

Saint Francis Hospital: a double-Y complex and a brand-new, nine-story inpatient care tower.

tions of his prescriptions were wasted. The new computerized unit dose system provides written schedules, and all medicines are sent up to the floors one dose at a time, so that no pill leaves inventory before its actual use, and waste is held to a minimum.

Getting the IBM system in place was done by a relatively small, six-member systems and programming staff at Saint Francis, headed by Director Bill Bigby and Programming Manager Gary Stoner. As Bigby says, "The IBM software packages enabled us to use less experienced people to install sophisticated programs."

The Saint Francis staff worked closely with Sharan Gilchrist, the IBM systems

engineer, and Vernon Liddle and Tom Marshall, customer engineers in the Field Engineering Division. "Through programmed instruction courses like COBOL," says Bigby, "our people were able to sharpen their technical skills at a faster pace, right here in the hospital. Meanwhile, Gary has become the recognized expert in Tulsa on those IBM software packages.

"What we've saved," Bigby points out, "is time. That's the one commodity money can't buy. I'd say we'll have saved ourselves as much as five years' worth by the time we realize the full potential of the system."

Anything that affects the running of Saint Francis comes to the attention of 80-year-old William K. Warren, a man of extraordinary foresight and business acumen. At 24, he borrowed $300 to start his own petroleum company, and by the time it merged with Gulf Oil 34 years later, Warren Petroleum's assets exceeded $300 million. When Warren bought the 80-acre spread for the medical complex, back in 1945, there was little there but shrub oak and grazing cows. But Tulsa has since grown around the site. (Since 1969, Saint Francis has been operated by the Sisters of Charity of the Incarnate Word, a religious order; its chief administrator is Sister Mary Blandine.)

Warren has an abiding interest in everything that happens at the hospital (his family, the principal benefactor, has donated many millions to it). In fact, he has an office next door.

With that kind of interest, it's no wonder that Warren drew Bill Slater aside when the first IBM equipment was installed, reminding him to be sure the hospital paid its bill. Among other things, W. K. Warren is an IBM stockholder. □

I... propose... of talented you women, w to serve their

Bill Cawer...l, Brazil, 19...

The time: 1961.
The President:
John F. Kennedy.
Three who heard
the call remember
what it was like.

They're bankers now. Or legislators.
Housewives. Teachers. Doctors. Store-
keepers. Some work in the data process-
ing industry. They're widely scattered
throughout the country. But they share a
bond that sometimes prompts them, like
old Army buddies, to stay in touch.
They're Peace Corps veterans, which
means they've spent at least two years
of their lives in government service
overseas, risking disease, sharing the
poverty, the routine, and the out-of-the-
ordinary in everyday lives of people
most of us know mainly through

UNICEF greeting cards.
In the heady Kennedy years, they
were young, mostly, and inspired with a
mighty mission. "Kennedy's Kiddie
Korps" some called them, and the way
graduates poured from the campuses
that spring of 1961 to join up, it did
seem that the youngest President since
Teddy Roosevelt had struck an irresis-
tible note of hope and idealism for what
was dubbed the "silent generation."
At its peak in the mid-Sixties, the
Peace Corps numbered more than
15,500 volunteers in 52 countries. Most

...a peace corps

Stuart Sullivan, Tanzania, 1976

...young men &

...skilling and able

country...

David King, Thailand, 1968

of the early ones were liberal arts majors or teachers. Then, as developing countries became more self-reliant, their needs changed. They asked for doctors and agricultural specialists—people already established in careers at home and more difficult to recruit. After Vietnam, too, a more cynical generation began to identify the Peace Corps with the Establishment. Today, the Peace Corps is a part of the larger ACTION agency, which also embraces six domestic volunteer programs, although there are bills before Congress

that could make the Peace Corps a separate agency or part of a larger foreign-aid administration.

There are currently only 6,850 Peace Corps volunteers, though they serve more extensively than ever—in 63 countries. In 1965, more than a dozen IBM people were on leave with the Peace Corps. By 1972, the number had dwindled to eight. The latest one returned to the company in 1976. IBM has no way of knowing how many of its employees have had Peace Corps experience if it occurred

before they joined the company.

Whatever its effectiveness—and it has been measured in leadership training and tuberculosis control, for example—the Peace Corps has left an indelible impression on those who've served. In the eyes of a former Peace Corps director, this may be the agency's most important legacy. "We have 70,000 volunteers back home in this country who have a firsthand understanding of the realities of the third world," he says. "You can't over-estimate the value of that."

Sean Sullivan, 41, is a long, lean, six-year veteran of the Peace Corps, with an impeccably barbered black beard he brought back from Africa in 1976. Sullivan joined in 1970, after seven years with IBM. He spent the first year in Washington, D.C., then four in Liberia and Swaziland as a training officer. His sixth year, he served as a volunteer and country director of Mauritius, a small island in the Indian Ocean off Madagascar. He is now a program administrator in public affairs in Armonk.

First in Liberia and then in Southern Africa I helped to train volunteers. About 300 of them, all told, mostly fresh from the States. Our job was to help them learn the language—Zulu was one—and get acquainted with the culture. The volunteers were slated to work primarily in agriculture, community development and health, and in teaching.

Mauritius was something else—only 27 miles wide, 30 miles long—with the most densely populated agricultural land in the world. It supports upwards of a million people—a polyglot mixture of East Indians, Chinese, some French, and Creoles. I had a dozen volunteers, including a woman Ph.D. fisheries biologist, trying to raise shrimp and fish to increase the protein diet; a marine biologist working on toxicity in fish; an architect helping to build low- and middle-income housing; and three nurses teaching in a school.

Eventually, things got sticky, and we had to phase out. It was a question of politics. One political faction was accusing us of being a front for the CIA. Too bad, because generally the Africans I knew were very hospitable to the Peace Corps. They liked us, as, indeed, they liked most Americans.

What did we accomplish? Well, I guess you might say we helped to raise the expectations of those people. But

even this is a mixed blessing, for while their needs are great, their opportunities for much improvement are still pretty thin.

People ask me, "Who are we to think we should tamper with the culture of those people?" Well, maybe so, but there is nothing romantic about poverty and disease, whether it be in Appalachia or Africa. So change is in order. But you've got to be patient about it. We simply can't impose our technological ideas on people not yet ready for them.

For example, if I get sick, I know it's because something has broken down or it's because of an infection. But for many an African, it means a neighbor has put a hex on him. Nevertheless, things are

David King, Sean Sullivan and William Ouweneel today

changing. I knew the son of a woman who lived deep in the bush and worshipped the spirits of trees. He's a Ph.D. in physics from Cambridge.

Sure, our worlds are different. But I learned that people everywhere are pretty much the same. All babies cry when they get sick. Their mothers worry. And everyone waits anxiously for them to get well.

One thing I do know—I got a lot more out of Africa than I was able to give.

In 1972, the Peace Corps came to IBM looking for someone to run its Brazilian operations. For William M. Ouweneel, then 42, it was a once-in-a-lifetime chance to serve his country. A tall, angular man who speaks intensely and precisely, Ouweneel served abroad for two and a half years. He is now a program manager for administrative education in the IBM World Trade Americas/Far East Corporation in Mt. Pleasant, N.Y.

It was a key experience in my life, something I had never experienced before and probably never will again. Our job was to help Brazilians improve their health care and get ahead in farming. We set up medical and bacteriological laboratories. We trained people to work as nurses and lab technicians. We even had special educators to work with the handicapped.

All in all, it was a good-sized program. We had about 350 volunteers and between 40 and 50 full-time staff workers. One-third of them were Americans; the rest, Brazilians. And we were spread out over a geography as big as that of the United States.

I soon found that if we really wanted to build something and leave something lasting behind, we couldn't go it alone—we had to work through other agencies and organizations in that huge country. After I had been there a while, I just would not get involved in any programs where that wasn't true.

We also zeroed in on the skilled and readily available kind of volunteer. Earlier in the program, there had been a tendency to look for people with rather exotic backgrounds—like Ph.D.'s in agronomy, for example. Later, we recruited volunteers with bachelor's degrees in agriculture, and we established programs where they could be productive in a way that really counted.

Even though I had worked in Brazil before—for IBM—the Peace Corps stretched me in ways business cannot stretch you. Meanwhile, I had a chance to do something for my country, and there's always a good feeling that comes from that.

All in all, the Peace Corps left me with some pretty valuable insights. We were dealing with people who were trying very hard to improve their lives, starting from a very, very basic level with almost nothing at all. I had never had any contact with people like that—people who've never been to school, who live in a house with a dirt floor and a thatched roof. What I learned is that these people are no different from me. It is only their way of life that is different.

David King was one of the early ones, a crew-cut foot soldier in the Peace Corps. He joined in 1962, at the age of 22, after only a year with IBM. King was among the first of the volunteers to go to work in the interior of Thailand. He is now an advisory engineer with the System Products Division in Poughkeepsie.

I went for some of the same reasons others join the Navy—to see a different part of the world and get a different view of things. I was not disappointed.

My job was to work with a rural community development agency. Not the most glamorous job in the world—we were helping to build sanitation systems. How successful were we? Well, let's say it was uphill much of the way. Our biggest problem came in trying to convince the villagers it was worth doing. I'd say, "That water you're getting out of your well—it's no good for drinking." They'd shrug and say, "Looks good enough to us." Then I'd show them the water under a microscope. But that didn't help. They didn't even have a word for microorganisms. I would translate it into *dua lic lic,* which means little, little body. But few of them could really understand what the microscope was showing.

Our problem lay in trying to help them *better* their lives. But better is a variable thing. They were not unhappy with the way things were. They had food enough. They needed only a minimum of clothing. And they required very little in the way of what we call "necessities" to get by.

One thing bothered me—it was hard, very hard, to know what they were thinking. They have what they call *gren-jai,* which means people always ought to be polite, even to the point of masking their true feelings. They'd say, "O.K. we'll come to your meeting." But you would learn after a while that they had no intention of coming.

The whole experience had a tremendous maturing effect on me. I learned there are ways of life that may look unacceptable to us, but they work in other systems. I got to know and to understand people better. And my exposure to Buddhism widened my religious views.

But it works both ways; I think, maybe, I helped them to understand us better. Thailand, at the time, was extremely pro-American. Yet what they knew about America was largely what they saw in Elvis Presley movies. They were curious about me—like when I explained that my parents lived in Albany and I lived and worked in Poughkeepsie 50 miles away, they found that hard to understand. It's been 16 years now, but I still feel good about the Peace Corps—probably because the more everybody understands everybody else, the better off we'll all be. □

By Martin J. Hamer

Superbrain

What scientists are now learning about what goes on in your head.

An extraordinary product of the human mind, the computer can do things no brain can do. A million or more times faster, it can count the stars or the particles in an atomic explosion; and in seconds, it can deliver answers that would take even the most facile human brain years to do.

But it is no match for the brain in flexibility. No matter how sophisticated, a computer cannot look at a Picasso and tell whether it is real or fake. It cannot create a King Lear or Anna Karenina.

All this the human brain can do. What's more, it can spin its miracles through a compact, relatively tiny three-and-a-half pound container of neuronal tissue. New discoveries about the brain and its chemistry, as the following article shows, may open up a new era of cerebral potential. Among the possible payoffs may be the brain's ability to create new and superior computers as well.

In a classic science fiction tale of the Thirties called "Vision of the Hydra," a professor named Alanson Willenborg dedicates his life to tapping the latent power of his brain. Through heavy concentration, the professor forces his laggard brain cells to work on three complex subjects at once. With his right and left hands he writes different treatises, while at the same time discussing a technical subject with a colleague.

Eventually, Professor Willenborg adds two other tasks—reading and chess playing—to his simultaneous mental repertoire. But he remains unsatisfied. He wants all 10 billion neurons of his mind to be so productive he can focus them all like an intense laser beam on a single great problem of the cosmos.

Finally, he achieves his ambition and notifies his colleague, who excitedly arrives at the professor's home to see the hydra mind in action and describes the scene: "I looked in and saw Alanson seated at his horseshoe desk . . . writing rapidly on sheets of paper with both hands. What was happening? Then I leaned over and understood . . . The pads of paper were scribbled with a senseless jumble of words. And a vapid face turned up to me grinningly . . ."

The moral of this horror tale, of course, is that it is dangerous to tamper with the work of Mother Nature—especially with something as intricate as the brain. Real-life stories of psychologists who tried to raise their children to become mental giants have often ended in disaster. But now, thanks to recent discoveries about the human brain, we may have found a way to enhance the power of this three-and-a-half pound organ.

The major find is that the brain can make its own drugs—a family of proteins known as peptides—which

can act directly on the organ to change aspects of mental activity hitherto thought to be unchangeable by chemistry. Do you want a fresh burst of creativity? There is a peptide from the brain that may provide it. How about a boost of intelligence? Believe it or not, scientists have recently found that the brain manufactures a protein substance that seems to help the mentally retarded and may provide a few extra I.Q. points for the rest of us. What about imagination, good memory and all the other desirable traits of the mind? They, too, are attainable to some degree, thanks to the new chemical discoveries that are expanding our understanding of the mechanics of the brain. "In the future," speculates one psychologist, "we may all go to a psychopharmacy to pick up brain pills that give us whatever mental or emotional traits we may want at a given time."

This is not as farfetched as it may seem. In a recent experiment, Dr. Abba Kastin, head of endocrinology at the Veterans Administration Hospital in New Orleans, gave a brain substance known as melanocyte stimulating hormone (MSH) to one group of volunteers and a neutral sugar pill (placebo) to another. The brain substance was known to create a change in the nervous system of animals that made the animals learn faster. When both groups of human subjects were tested on a variety of tasks, Dr. Kastin found a significant difference in the group injected with the brain extract over those given the placebo. The former group showed increased attention and learning ability, while the second group remained virtually the same. In another experiment, Dr. David de Wied of the Netherlands gave the same substance to a group of mentally retarded subjects and found that it enhanced memory as well as learning ability.

Until recently, only a few chemicals were ever obtained from the brain and linked to behavior; these became known

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by Lee Edson

Want to be more creative? Hype your I.Q. a couple of points? With what scientists are now learning about the brain, you may someday be able to do it. With the help of your doctor or a prescription at the druggist.

as neurotransmitters because they carried messages from neuron to neuron across a minuscule gap—the synapse —between the neurons.

In the last few years, scientists have been able to penetrate deeper into this chemical makeup of the mind and to pinpoint the actual substances that are related to mood, memory and other mental events, and to track these substances and their paths in a fairly precise way through the brain. It has now been found that there is an unexpectedly large range of neurotransmitters—some 25 have been turned up so far—and that each one is secreted by its own neuron and has its own path. This knowledge has given scientists a new perspective of the brain and opened up a way to determine how pain is perceived and transmitted to the brain, how eating and drinking, mood, and even sex are regulated deep within the cortical structure.

The three key figures in this breakthrough are Ph.D.'s Roger Guillemin, ■ physiologist of the Salk Institute in La Jolla, Calif. (and a former French Resistance fighter in World War II); his colleague, biochemist Andrew Schally of the University of Texas; and Rosalyn Yalow, a physicist at the Veterans Administration Hospital in the Bronx, N.Y. In the 1950s, Dr. Guillemin —an intense, scholarly man—became interested in the cherry-sized pituitary gland, because of its role in controlling the thyroid, pancreas, sex, and other endocrine glands. Textbooks described it as the master gland of the body.

Dr. Guillemin thought, however—as did Dr. Schally and others—that the pituitary might take its orders directly from the hypothalamus, a cluster of cells in the middle of the brain long known as a kind of relay point for messages that tell the body when to eat and drink. Hints of the supervisory role of the hypothalamus had come from several experimenters who extirpated the tissue from animals and found that the pituitary failed to secrete its normal load of hormones. Dr. Guillemin felt that ■ triggering chemical was somehow involved in this reaction. He knew that

if such a chemical existed, it had to be in tiny traces or it would not have escaped the chemists' notice over the years.

Fortunately, in the Bronx, Dr. Yalow had developed a sophisticated radioactive technique that enabled scientists to tag and measure exceedingly tiny amounts of trace chemicals as they moved through the bloodstream. With the help of this technique, Dr. Guillemin and his associates began a long search for a trace of hormone in the pulverized brains of nearly two million sheep, arduously collected from slaughterhouses. At the same time, Dr. Schally started looking for the elusive chemical in an equal tonnage of pigs' brains.

After years of grinding, straining, filtering, and tracking their prey, Drs. Guillemin and Schally simultaneously found what they were after—a fragment of hormone made in the brain that released another hormone from the pituitary. They named the trigger chemical TRH, for thyrotropin releasing hormone. It proved to be so potent that a milligram could affect hormonal output throughout the human body; this fragment could stimulate the flow of milk in all mammals and boost the mental power of cretins.

The discovery of TRH was only the beginning of a spate of useful hormones found in the brain, many of them subsequently isolated and purified by Dr. Guillemin. One of them, LRH (luteinizing releasing hormone) controls reproduction—useful in resolving infertility problems. This hormone also appears to have an aphrodisiac effect on the brain, causing impotent males to become virile. Still another hormone plays a role in stopping involuntary muscle tremors. It has been used with an oral dose of L-Dopa (the famous drug now in use against Parkinson's disease) in treating tardive dyskinesia, an uncontrollable movement of head and tongue. These hormonal fragments proved to be part of a newly discovered body message system that provides a rapid-fire linkage between the great but slow acting endocrine system and the faster acting nervous system. One scientist describes it as the Mailgram of the body.

In 1977 the Nobel Prize in Medicine was awarded to Drs. Guillemin, Schally, and Yalow for their work in shedding light on the connection between the nervous and endocrine systems and for putting the pituitary in its proper place. The pituitary, explains Dr. Floyd Bloom, an associate of Dr. Guillemin, "used to be the conductor of the endocrine symphony. Now it is only the concert master."

Today the role of neuropeptides in human behavior continues to open up new vistas in medicine and research. At the University of Basel in Switzerland, Marcel Monnier and Guido Schoenenberger discovered that injecting blood from sleeping rabbits into awake rabbits put the latter to sleep. The scientists isolated a chemical, which proved to be a peptide, and synthesized a chemical of the same structure. This is now being clinically tested for severe cases of insomnia. The advantage of the peptides over some conventional sleeping pills is that they allow dreaming to occur during sleep. Dreaming is an important mechanism for relieving the individual of psychic tensions and is also related to creativity. It is thought that a peptide taken from a dreaming stage and given to a sleeping individual might actually induce "creative dreams."

If peptides can bring on dreaming, can they also be used to transmit memories? George Ungar, a Hungarian-born biochemist, says yes. In 1970, he announced that he had taught a rat to fear the dark and then transferred this fear to another animal by injecting it with a peptide from the brain of the first animal. Before his death last year, Ungar announced that he had been able to extract other memory peptides from the brains of rats. One was obtained from the brains of animals trained to ignore a repeated sound. When the chemical was injected into other animals, they too, ignored the same sound.

Perhaps the most intriguing peptide usage is in the understanding and control of pain. A few years ago, Avram Goldstein of Stanford University stirred more scientific curiosity by announcing that the brain had natural receptors for

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opiates. Why would nature provide such a thing? One possibility was that the brain made its own opiates.

In 1975 two scientists, Dr. Lars Terrenius of the University of Uppsala in Sweden and Dr. John Hughes of the University of Aberdeen in Scotland, independently found an opiate-like substance. It was labeled endorphin, for endogenous morphine (the morphine within). Goldstein also found the opiate in the pituitary gland.

What is the function of the brain's own morphine? To find out, Goldstein placed a number of normal people into stressful situations and then gave them naloxone, a drug that antagonizes morphine and prevents its action, while others were given a placebo. Those receiving the placebo relaxed when the stress was removed; those on naloxone remained keyed up, indicating that the morphine within is needed to keep us on an even keel. "Maybe we all carry our own dope in our heads," says Goldstein, "so we don't get uptight—or at least to help us overcome our being uptight."

Peptides may also be the key to the chemistry of mental illness. Dr. Guillemin, for instance, found an endorphin called somatostatin that turned a rat stiff as a board for three hours. Nothing could make the animal move a muscle. Some scientists became interested because the immobile state suggested that endorphins may be the key to catatonic schizo-phrenia, a form of the disease in which the patient remains rigid and silent.

It is too early to tell what it means, but Dr. Terrenius and his colleagues have found that this endorphin does appear in unusual amounts in the urine of schizophrenics.

Dr. Frank Ervin at the University of California at Los Angeles tracked down another endorphin, called leu-endorphin in the dialysis waste fluid of schizo-phrenics treated for kidney disease. These patients all lost their hallucinatory symptoms after dialysis.

In still another study, Dr. Nathan Kline, director of the Rockland Research Institute of Orangeburg, N.Y., gave endorphins to several schizophrenic and depressed patients and found positive effects in all of them. The depressives had a mood lift, and the schizophrenics felt a sense of euphoria that lasted for hours.

Only a few years old, peptide research is already drawing scientific workers from many disciplines from all over the world. Peptides have shown an extraordinary capacity to stimulate brain cells to overcome deficiencies and to enhance qualities of memory and learning already there. They hold the secret to mood and emotion and to pain perception. If their promise continues to be borne out by subsequent research, the peptides may indeed create through chemistry the era of the superbrain. □

If, as the author suggests, a new era of cerebral potential may lead to new and superior computers, who can say that the reverse may not also be true as computers probe the secret workings of the human mind?

Not surprisingly, IBM's Thomas J. Watson Research Center in Yorktown Heights has several brain projects on the boards. There, Drs. Roger D. Traub and Frederick A. Dodge, Jr. are using computer models to explore the wonders of that mass of nerve tissue that lies within the head. Their research has dealt with such things as the integration, or fitting together, of neurons or nerve cells, and the signaling properties of those microscopic cells that function as tiny transmitters.

Bewildering? Yes. But, as Dr. Traub explains, "There's a good deal of electrical activity going on in a neuron or a nerve cell, and by constructing a computer model of a single cell, we can get a better understanding of that activity."

Meanwhile, Dr. Traub has also been working with Dr. Rodolfo Llinás of the New York University School of Medicine to study the oddly named hippocampus, a Greek word once used to describe a mythological creature with the head and forequarters of a horse and the tail of a dolphin or fish. This is an area of the brain where epileptic seizures can occur, and further research may show new ways of treating such seizures.

What's it all going to mean to us? That's hard to say. But of all the mysteries of creation, none is more elusive than the workings of our mind.

Possibly, out of our urge to know, and the ability we now have to probe in ways we never knew before, there may come a time when we shall actually be able to improve healthy minds and help those that are troubled.

Computers go whirlybird

For the Federal Systems Division, LAMPS is one of the most ambitious and demanding projects in its 23-year history

The tiny armada plows through a gentle roller-coaster sea under sullen, pre-dawn clouds. Leading the way is the *Mt. Baker,* a 20,000-ton ammunition ship pretending it's a destroyer. On the flanks, pitching like corks, are two converted minesweepers, ready to act as enemy patrol craft or long-range sub-marine detectors.

On the deck of the *Mt. Baker* is a large Sikorsky helicopter, its rotors turning, its antennas bristling like porcupine quills. Now the helicopter hunches up, lurches sideward and forward, then lifts itself into the sky. The plop-plop of its engines fades as it drifts like an airborne crab toward the horizon.

Back on the deck of the *Mt. Baker* sits what looks like an unmarked moving van. It's crowded with sophisticated electronics devices. "Black boxes," the technicians call them, and they include computers, communications gear and displays. Inside the van, IBM and Navy technicians stare intently at the displays as the screens begin to fill up with data from the helicopter's computers. Head-sets crackle. The pilot is reporting in as he begins his search for an "enemy" submarine.

This final day of open-sea tests held in November and December of 1976 would cap an intensive two-year effort by IBM's Federal Systems Division.

It all began in 1974 when the U.S. Navy's Naval Air Systems Command selected FSD to be the prime contractor for LAMPS MARK III.

LAMPS stands for Light Airborne Multipurpose System. Essentially, it's an on-line, real-time, sea-going tactical command and control system for smaller ships like destroyers and frigates. Using a variety of sensors, computers and voice and data communications links, the helicopter serves as a highly mobile

by Robert B. Forest

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Freelance writer Robert B. Forest is a former editor of Datamation.

eye in the sky for the mother ship. It extends over the horizon the range of the ship's electronic eavesdropping and thereby, the ship's ability to detect, locate, identify, classify and counter the threats of enemy submarines and anti-ship missile platforms.

The mother ship tows long arrays of acoustic sensors that pick up distant sound sources from beneath the sea, whether whales, distant ships, storms —or a submarine. An on-board IBM Proteus computer analyzes the signals and converts them into data for display in the ship's combat information center.

The helicopter, meanwhile, is ranging far to pick up signals from beneath the sea or from the air. It has special-purpose computers aboard to process the signals from its many sensors and convert them into digital form for processing and display on both helicopter and ship. There is also voice communication. There's even a handy gadget that lets the three-man helicopter crew know if signals represent a threat. It's called, appropriately, Identification Friend or Foe (IFF).

The helicopter also receives signals from air-dropped underwater acoustic sensors (sonobuoys). This data is also analyzed and processed for display on both ship and helicopter. When signals from the sonobuoys indicate a foreign object beneath the water, the pilot takes his craft down close to the surface. The Magnetic Anomaly Detector, towed behind the helicopter on a steel cable, provides signals to confirm and locate a submerged submarine.

The fact that the helicopter can perform both antisubmarine warfare and anti-ship surveillance and targeting missions represents a major advance of the new LAMPS system. Its forerunner is limited to antisubmarine warfare.

When the helicopter descends below the line of sight of the command ship, the tactical control system aboard the aircraft allows the pilot to assume con-

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trol of the mission. He can order torpedoes launched, if necessary. Thus, the helicopter can double the range of the command ship's weapons system.

When Admiral Elmo R. Zumwalt, Jr., (now retired) was appointed Chief of Naval Operations in 1970, one of his first acts was to launch Project 60, an ambitious plan for modernizing the U.S. Navy. As Zumwalt says in his book, *On Watch,* "Expediting LAMPS, which was already in the design stage, was one of the high-priority items in Project 60."

Zumwalt and other Navy planners wanted to provide the Navy with faster, smaller units with greater striking power, range and flexibility—and with more surveillance, targeting and firepower distributed to smaller ships. LAMPS was to be the heart of that strategy.

When the Navy named FSD the prime contractor for the new LAMPS system, it marked the first time an electronics firm—rather than an aircraft company—had been given total responsibility for a major defense project.

Why FSD? For one thing, the Navy realized that LAMPS III was a system requiring the meshing of several complex technologies, involving surface, air, undersea and communications electronics.

Says James A. Bitonti, FSD vice president for operations and LAMPS program manager: "The emphasis is upon reliability, maintainability, usability and performance. Meeting these rigorous requirements called for a systems house capable not only of marrying distinctly different, complex technologies—but also managing their integration."

That job includes final responsibility for assuring that each element—each component, box and subsystem, including the helicopter—performs as required. It also means that FSD must meet cost objectives and deadlines.

The project will eventually involve

some 40 subcontractors. There are 20 different arms of the military to maintain liaison with. "There are," says George Houser, assistant LAMPS project manager in Owego, "100 black boxes on the helo [helicopter] and 60 on the ship. Ultimately, there will have to be over 100 ships modified for installation of LAMPS III. There are 11 computers —5 on the ship and 6 on the helo. We're responsible for seeing that all of this equipment does its job."

That means FSD must not only conduct rigorous inspections and tests, but also provide the support to enable the system to operate at sea under the most difficult conditions.

"It's a big act," says Houser.

So were the open-sea tests, the toughest challenge FSD faced. It was the first attempt to integrate, in the open-sea environment, all the elements of the system. It also involved interfacing with all three naval forces: surface, submarine and air.

In the first open-sea test there were 18 exercises. Six of them were controlled: the ship knew the position of the "enemy" sub within a few miles. But 12 were "free play." "All the ship's command knew was that the sub was on one side or the other," says Houser. "and within maybe 30 miles. That's a lot of ocean—three to four thousand square miles' worth. But we found and electronically tagged the sub on over 90 percent of the free-play missions.

"That,' 'he adds, "is spectacular."

There were few bugs, and none of them serious. Out of 361,000 words of software code, only 1,300 had to be changed. That's less than one-half of one percent.

The test results earned a "Well done" from the Navy, followed by a preliminary go-ahead for the development phase of the system. The contract has now been signed.

Says Admiral Fred H. Baughman,

vice commander of the Naval Air Systems Command and LAMPS MARK III project manager: "This system is a key element of the surface Navy's fundamental strategy of control of the sea lanes upon which our nation depends. These early open-sea tests indicate that the system will enable us to make far better tactical use of our smaller combat ships."

The job isn't over yet. During the next four years, FSD must put together a prototype system—including all the sensors, black boxes, data links, computers and displays—for turbine-powered destroyers. If all goes well in those tests, production will begin in 1981.

FSD must also manage the development of all the equipment and subsystems needed for the helicopter to fulfill such missions as search and rescue, recovery, communications relay and medical evacuations. And produce over 500,000 words of software—some of it for computers that will be under development concurrently with the software.

Eventually, some 500 FSD employees will be involved, working mainly out of Owego, Manassas and Bethesda. Says Jim Bitonti: "LAMPS III has the potential of becoming the biggest FSD project ever—bigger than the B-52 program in which we have been involved for over 20 years.

"LAMPS meets all the criteria for the programs that FSD seeks out: It is of vital importance to our country; it takes advantage of a wide range of our technical and management skills; and it is a program to which FSD can make a unique contribution."

Some FSD people feel the Navy made a unique contribution to *them*. They enjoyed the open-sea exercises. Bob Leavenworth, an Owego staff member who was one of those aboard, says that the *Mt. Baker* gave a smooth ride, "and the food was great." □

In Tom Clump's prairie territory, word that a System/3 has "gone down" creates the neighborly concern one farmer experiences at news that another's prize bull is running a temperature.

(Continued from page 31)
rapher." The Morse wire had been discontinued several years before, and the telegrapher had retrained as a terminal operator in a technology undreamed of when he joined the railroad in 1949.

The IBM system, he said, kept track of every piece of rolling stock on the Burlington, from St. Paul to Seattle to Texas. If a carload of sand, flour, sugar beet pulp or iron ore was dropped off or picked up in Sidney, he had to issue a card for it and feed it to the terminal. "This coal thing" had increased the importance of timely waybill entries, wheel reports, train lists, switch lists, detail counts and car and train movements.

The new motor fixed the problem. Clump called the Burlington's "operating data control" in St. Paul, transmitted and waited for St. Paul to confirm that Sidney was back on-line. How was the 1050 in Glasgow, he asked.

Still low blood pressure and slow pulse rate, St. Paul answered in effect. The FE scope, which acts like a video playback, had been flown in that morning but had not yet located the problem.

Clump called the FE office in Helena to report the Burlington's terminal in Sidney was O.K.

To reach Beach, he had to backtrack to Glendive, the nearest wintertime point at which he could turn southeast. He had planned a run to Wolf Point, 90 miles north of Sidney, on the Missouri River, to discuss the upcoming installation of the first System/34 in Clump's territory. He called to cancel the appointment.

As you head for Beach on Interstate 94, the coal trains are visible. Twelve trains a day of 100 coal cars each, they never stop. The empty coal hoppers click their way west through Glendive and the coal fields to the south, where they pass under giant coal bins that pour 100 tons of crushed coal into each car. The loaded trains complete their circle and

rumble back down the Yellowstone through Glendive and east through Beach toward the Midwest. More than a quarter of the Burlington's freight nowadays is coal, a new development of the past two years.

The Farmers and Merchants Bank in Beach, a town of 1,500 just across the border in North Dakota, had closed to the public for the day, but Clump was admitted with cries of joy from two men and a woman, all vice presidents, who had been waiting for him.

Irv Simonson uses his System/3 to pick up every transaction every day, he said. Even the annual statement to the customer can be run off in no time as a result of the constant updating. But now he was two days behind, and that worried him.

The cards borrowed from Verhasselt had no effect on the bank's balky 5444 disk file. There was garbage on the printout. Clump and Simonson fed the computer the punched cards of a diagnostic program. More garbage.

"The zeros don't go anywhere," Simonson said. "The head zero stays in home position."

Clump nodded, pulled open the disk pack drawer and unscrewed the pack cover. His worst fears were realized. The read head had crashed, scoring the magnetic fixed disk.

"I'll send for a new head," Clump said, "but let's see what we can do for an interim fix."

On his hands and knees, he studied the delicate read head and said it looked slightly twisted. He took off his suit coat and worked on the head in absorbed silence. An hour passed. One of the tellers had brought in a can of peanut brittle, and this was broken out as dinnertime neared. Shortly before 7 p.m., Clump was ready. "We can wait for the new head," he told Simonson. "Two days. Or see if it works now. You could spoil a disk pack."

"Let's try it," Simonson said.

Clump carefully unsealed an extra disk pack of Simonson's and took a removable disk from it to serve as a fixed disk in the 5444. The three bank executives gathered around the bin that caught the readout paper and waited. Clump fed through the diagnostic card program again.

"It's coming through," Simonson called to him. "Will it hold up?"

"Just long enough for me to get home and get your call to come back down here," Clump replied.

Everyone laughed, and Clump was presented with a plastic cup of machine coffee. "Get the girls back over here," Simonson told an associate. The tellers would be working most of the night to catch up, storing two days' transactions on the magnetic disk.

It was another 40 miles in the dark, back to Glendive. From a hilltop far ahead, a few scattered lights identified Wibaux, a small town where Theodore Roosevelt used to drive his cattle for rail shipment when he ranched in northwestern North Dakota.

In Glendive, Clump unloaded his tool boxes and defective motor and called the FE manager at his home in Helena.

"They located the 1050 trouble in Glasgow," he said after hanging up. "The part being flown in tomorrow should fix it."

When Clump got home he found that Brutus, the bull, had torn down the fence, and the herd was into the high stack of hay. He patiently changed into jacket and blue jeans, repaired the fence and rounded up the cows and horses. It was midnight when he got to bed.

To one flying east out of Billings on a crystal-cold, clear day, the Yellowstone Valley resembled the veins of a leaf etched on clay. From still higher up, the bleak, snow-dappled prairie looked devoid of all human habitation.

But down there somewhere, Tom Clump was nearing Glasgow, following a deserted road north toward the Missouri, driving through infrequent crossroad hamlets—Lindsay, Circle, Vida. It would be more diagnosing, fixing, testing and more fixing until he got the 1050 operational. And this time he knew he would. Then another three-hour drive through terrain as forlorn as the moon's surface.

Working the prairie can be a lonely business. And exactly right for a man who doesn't like to be crowded. □

to think

Let the sunshine in

I chanced to see a copy of *Think* recently. Your courage and foresight to bring the problem of chemical abuse out in the open and assure employees that the company will stand behind them during treatment is a ray of intelligent light in an area that is bogged down with ignorance and fear. ("Scrambled? Need Help?" November/December).

Margery Allen
Rochester Drug Abuse Prevention Task Force
Rochester, Minnesota

Aztec interest

Because I'm a systems engineer in IBM France and have studied Precolumbian Mexico for 10 years, I was most interested in your article, "José Aste and the Incas," in the November/December issue. Although my major interest is the Aztec language, which I study with computer help, I think I could have very useful exchanges with Dr. Aste.

Marc Eisinger
IBM France

Bank credit

In the January/February issue, you spoke about IBM products used in conjunction with today's bank cards ["Oodles of cash. But who needs it?"]. I think it would be worthwhile to add two important contributions within IBM which made that possible.

From 1966-1970, the Value Exchange Program in the Advanced Systems Development Division, Los Gatos, helped contribute to the American Banking Association's decision to adopt the mag stripe credit card. The San Jose Special Engineering operation also contributed greatly to the initial announcement of IBM products in support of the ABA-adopted magnetic striped card standard.

SCD Kingston contributed to the development of the IBM 3600 system, which included the use of magnetic stripe cards and passbooks as an adjunct to our financial terminal capabilities, resulting in the 3600 announcement in 1973, and the widespread acceptance of machine-readable cards in today's finance industry systems.

Jerry Svigals
Los Gatos, California

Extra mileage

Our gratitude for your kind permission to reprint the article entitled, "Handicapped? Not on the Job," which appeared in the July/August 1977 issue of your publication. We have had 1,000 copies of the article reprinted.

Anthony Dingman
Job Placement for Handicapped People
Saint Augustine's College
Raleigh, North Carolina

On the run

Your article on the New York City marathon in the November/December 1977 *Think* was extremely interesting to me since I ran my first marathon in the "City of Lakes" marathon on October 9, at Minneapolis. Another entrant was Hal Martin, the general manager at IBM Rochester. He is perhaps the only general manager in the history of IBM to run a marathon.

R. G. Allen
Rochester, Minnesota

On the mark

The reason for this letter is to comment on the article, "Oodles of cash. But who needs it?" in your January/February issue. My husband is an American IBMer on assignment here in West Germany.

Since November/December 1977 we have been horrified to watch the rapid drop in value of the dollar. In 1974, the dollar was worth 2.60 deutsche marks. Today it is worth only 1.97 DM. So when I calculated the value of the dollar the way Mr. Pierce did in his article, I put down my shopping basket, cancelled my trip to the market and went to my wine cellar to check on my hoarded supply of precious American peanut butter!

Janet Carol Bedford
Ottmarshausen, West Germany

Numbers, please

I found the article, "Scrambled? Need Help?" in the November/December edition of *Think,* very interesting and informative. Providing the locations and tie line numbers of the doctors is a good idea. But many of our General Systems Division CE people are in locations that do not have tie lines and you should provide the outside phone numbers.

K. Sue Gurwit
Atlanta, Georgia

The long-distance numbers are: New York area, Dr. Alan McLean (212) 223-3608 Chicago area, Dr. Al Ondrako (312) 245-5961 Los Angeles area, Dr. Bill Martin, Jr. (213) 736-4238

Still going strong

With reference to the, "Now, Why Didn't I Think of That?" article [January/February], I would like to offer some impetus to the excellent ideas presented. By the time I retired in 1971 from New York FE, I had won 140 suggestion awards. Perhaps a very modest number compared with Jack Ackerman's astounding achievement. I still feel the pleasure of the accolades I had received from high echelon personnel.

Robert B. Roberts
Lehigh Acres, Florida

What about IRD?

Since receiving *Think*, I have not seen an article or any mention of the Information Records Division. I have no idea if articles on the Division have been written in the past, but it seems that we have been neglected. The IRD Division is an integral part of IBM and deserves equal time.

Leonard A. Smith
Greenbelt, Maryland

(Editor's note: IRD's Cathy Bartlett is on the cover, and Mike Clark is one of this issue's super rookies. In the works: a feature on the new blood cell processor.)

Let those chips fall where they may

Hardly a valentine, either of those letters about our bowl of chips cover last issue. But we'd have been happy to print them anyway. If only they had been signed. Good or bad, tell us what you think about what you read. Write: Editor, Think, 7-11 South Broadway, White Plains, N.Y., 10601.
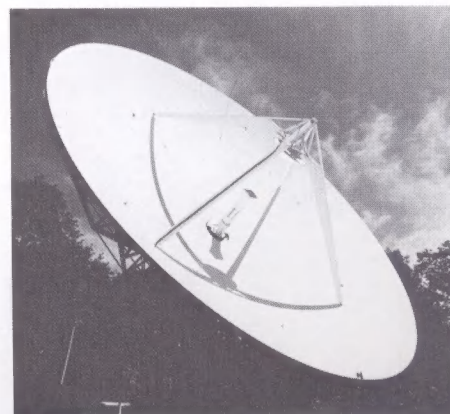
catch up

STAYING COMPETITIVE

Another meeting for IBM President John R. Opel with security analysts, this time in Boca Raton. In response to questions from the analysts, Opel said the company is pressing hard to shorten delivery time on the large processors now coming out of Poughkeepsie. With a heavy backlog on order, those systems are expected to make an important contribution to the company's future revenues. As for competition from abroad, Opel said IBM can meet it, in the U.S., in Europe or anywhere else. All IBM asks for, he told his listeners, is fair competition.

DOUBLE-PARK SALE

After reading *The Wall Street Journal* story, the prospect was on the phone. Twenty minutes later, he had arrived at the General Systems Division's new Business Computer Center at 2 Penn Plaza in New York City. He didn't want to see the system or talk about it. He knew it was right for him. He even insisted on signing a blank sales agreement, leaving center manager Steve Budow to fill in details. Why the haste? It turns out that he was double-parked 27 floors below and was afraid of having his car towed away. Not all customers are in quite such a rush to order IBM's new 5110 computer. But orders have continued to build for the company's lowest-cost computer since it was announced on January 10. At the New York Center, one out of five demonstrations between announcement day and February 1 has resulted in an order.

UP WITH URBAN RENEWAL

Downtown urban renewal got still another boost recently when IBM announced plans for the construction, in a joint venture with two other companies, of a 31-story office building on a two-block site in downtown St. Louis, not far from Busch Stadium. The building will be the largest in Missouri. Other major cities in which IBM has constructed office buildings in urban renewal areas include Baltimore, Columbus, Philadelphia, Pittsburgh and Memphis. Others in the "tri-venture" in St. Louis are the First National Bank in St. Louis and the Equitable Life Assurance Society of the U.S.

GSD's new desk-top 5110

You'll be seeing them on rooftops

St. Louis. Gateway to the West

JUSTICE BALKS AGAIN

Things continue to slide in the Antitrust Division's suit against IBM. Despite an earlier agreement that would have ended 'discovery,'' or the preliminary examination of witnesses, by June 1974, the government got permission last summer to take sworn statements from 79 more witnesses. In the intervening eight months, it has completed the testimony of only one. With 78 left to go, the Antitrust Division has now asked the court's permission to take statements from still another 110. In opposing that February 15 motion, IBM's counsel said, "The time has now come . . . to put an end to plaintiff's attempt to turn the clock back four years and to reopen—for itself only—discovery that should have been finished long ago."

TRYOUT FOR SBS SYSTEM

Sometime this summer, IBM people at major East and West Coast locations will be able to talk to each other by satellite from their present telephones. To get on the network, callers will dial a special code. Equipment developed by the System Communications Division will then route the call and select a communications channel through the satellite system. At the other end, IBM equipment will complete the connection. SCD will also be using the facilities for its day-to-day computer communications. The satellite service is being provided IBM by Satellite Business Systems. It's all part of a program to evaluate techniques to be offered commercially by SBS starting in 1981.

BIG STAKES ABROAD

It's no secret that IBM is looking overseas for much of its future growth. Less noted is that the U.S. economy itself is becoming increasingly dependent on world trade. According to recent government figures, the portion of U.S. Gross National Product coming from foreign trade has doubled over the past 20 years. One out of eight manufacturing jobs now produces for export. One out of three acres of farmland produces for export. And one out of three dollars of U.S. corporate profits comes from the activities of those firms who conduct business abroad.